

Henry C. Pearson,
F. R. G. S.,
Founder

INDIA RUBBER WORLD

William M. Morse,
Editor

Volume 84

September 1, 1931

Number 6

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Published on the first of each month by Federated Business Publications, Inc., 420 Lexington Ave., New York, N. Y. Publishers of *Antiquarian*, *Automotive Electricity*, *INDIA RUBBER WORLD*, *Materials Handling & Distribution*, *Music Trade Review*, *Novelty News*, *Premium and Specialty Advertising*, *Radio Digest*, *Radio-Music Merchant*, *Rug Profile*, *Sales Management*, *Soda Fountain*, *Tires*; and operates in association with *Building Investment*, *Draperies*, and *Tire Rate Book*. Cable Address, ELBILL, New York. Subscription \$3.00 per year postpaid in the United States; \$4.10 per year postpaid to Canada; \$3.50 per year postpaid to all other countries.

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SIMPLICITY ITSELF

There is a cry these days about increased efficiency through simplification and a resulting reduction in loss and waste.

When you want to simplify Acceleration, try these suggestions:

A—Captax alone—and plenty of it
for first class quality.

B—If you can't handle Captax, try
Altax + Tuads as a combination
that handles easily in the factory
and gives a bang-up cure.

See the *Vanderbilt News*, Vol. 1, No. 4, Pages 9 and
11 for facts and figures.

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What kind of scrap stocks are you throwing
together—Are they similar or widely different in
curing characteristics?

WAREHOUSES:

AKRON

Union Terminal Warehouse
East South & Brook Sts.

CHICAGO

Midland Warehouse &
Transfer Co.
43rd & Robey Sts.

BOSTON

Francis Fitz Co.
30 Pittsburgh St.

TRENTON

Anchor Warehouse Co.
New York & Olden Ave.

TORONTO

Toronto Storage Co.
17 River St.

SAN FRANCISCO

Haslett Warehouse Co.
280 Battery St.

LOS ANGELES

Santa Fe Warehouse Co.
300 Avery St.

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, 400 Graybar Building, New York, N. Y.

Volume 84

New York, September 1, 1931

Number 6

Rubber Printing Plates

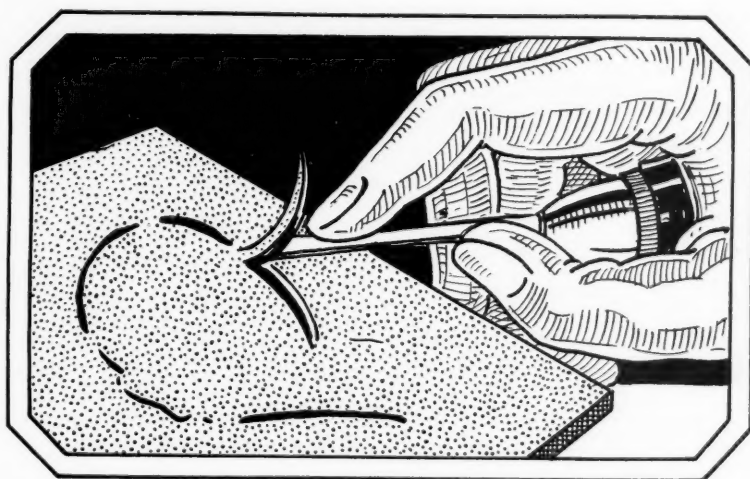
Hand Engraved Rubber Plates for Color
Printing in Water Color or Oil Inks

THE readiness with which rubber can be molded and vulcanized makes possible the production of the familiar rubber hand stamp. This application constitutes, in fact, an important minor branch of rubber goods manufacturing.

Removable molded rubber type and type faces cut from sheet are a later and familiar means of printing rubber on cloth and similarly uneven surfaces. While these crude methods answer very well for rough work, only recently have rubber printing plate processes been perfected that rival the use of zinc plates in effectiveness and economy.

Of these processes that known as the Parazin¹ plate method is of special interest because of the readiness with which the plates can be prepared by any artist or engraver. The material used is a patented rubber composition which has been perfected after long experimentation.

The advantage of printing with rubber plates is that their cost is about half that of zinc and the resilient printing surface has a peculiar affinity for water-color ink which gives a smooth and even spread of color. These plates will also print oil inks like metal plates. In color printing they are



Outlining the Rubber Printing Plate

employed effectively in conjunction with zinc or copper key plates.

Three types of rubber plates are manufactured. A is a type high plate used for routing and engraving; while B is a metal backed plate 11 points thick for use with patent base or for mounting on electrotypers' wood to bring it to type high. C is the unmounted or blanket form.

Two operations are involved in preparing a printing plate. The design is transferred to the plate surface and then engraved. There are three practical methods for transferring the design. First, by pencil tracing; second by offsetting from a zinc outline plate; third, by printing the design photographically from a photo-engraver's negative directly on to the rubber plate, or from a tracing on to the plate. The first method is the simplest and is practical where very accurate register is not essential.

A fairly soft pencil is used to trace the design on vellum tracing paper. The tracing is then turned down on the rubber plate and rubbed from the back with a burnisher. If the plate is wiped with an oily cloth before rubbing, the tracing will show in sharp relief black line on the plate.

The procedure of offsetting a zinc outline key-plate is simple and offers the certainty of accurate transfer necessary for

¹Parazin Printing Plate Co., Rochester, N. Y.

precise carving and close registration. The details are as follows. The entire outline of the design is traced and inked in black waterproof ink and a zinc etching is made from this tracing. The person who is to carve the plates then transfers the design by offset from the zinc to the surface of the rubber plate.

The offsetting is done thus: The zinc plate is carefully inked with a good grade of proving black. The proof can be pulled on any kind of press although a Washington hand-press is best. Here the use of bearers is advised to avoid too much impression and the possibility of distortion. Clay coated paper will give best results for this proofing.

While the proof is still wet, it is turned face down on the rubber plate, and pressure is applied either by hand or in a press to offset the impression. The design is thus transferred to the required number of plates. If more than three plates are planned, it is well to pull two or more proofs for offsetting in order that sufficient ink may be present to insure sharp clear transfers.

After the impressions have dried thoroughly the next step is to make the color separations. By using the original color sketch as a guide, the spots of color to print from each plate are indicated on its particular plate by staining the required areas. The design is ready for carving when each plate has been blocked in, stained for color, and carefully checked for accuracy of staining and intended cross printing.

Photographic transference of the design is accomplished without a camera by the printer in his own plant or by his photo-engraver. An actual-size ink tracing of the complete design is made with waterproof ink. After the tracing is completed the Parazin is prepared.

In order to get sufficient contrast between the photograph and the plate it is first necessary to coat the latter with a thin layer of Kodalak. When this coating is thoroughly dry, a sub-coating of the following composition is applied in order to make the sensitized coating adhere to the Kodalak.

SUBBING SOLUTION

Hot water	750 cc.
Hard gelatin	20 gr.
Potassium chrome alum (10% solution).....	100 cc.
Methyl alcohol	200 cc.
Cool the solution before adding the alcohol.	

Apply this subbing solution with a brush and allow it to dry before coating with the following sensitizing solution.

SENSITIZING SOLUTION

Hot water	750 cc.
Hard gelatin	50 gr.
Ferric ammonium citrate.....	50 gr.
Potassium ferricyanide	25 gr.
Potassium chrome alum (10% solution).....	50 cc.
Water to make 1 liter.	

In preparing these solutions the gelatin is soaked in the hot water until thoroughly dissolved; then the chemicals are added. The sensitizing solution is prepared, coated on the plate, and dried all in yellow light. Thus sensitized, the rubber is exposed through the tracing to sunlight or an arc light and then washed with cold water for a few minutes to dissolve the excess chemicals and stabilize the photo print to light.

After drying, the operation is complete. Good copies are obtained with relatively short printing times, 2 to 3 minutes, depending upon the transparency of the tracing and the intensity of the light.

A few hand gravers only are needed to engrave the plates. All tools should be kept very sharp for clean cutting through the composition. The design is first outlined on the plate with a small U-shaped tool held at an angle of about 30 degrees. With firm, steady pressure the tool will make a sufficiently deep cut. It is advisable for the beginner to cut outside the lines. When more experienced, it is best to cut in the center of the lines thereby assuring more perfect registration.

After the design has been outlined with the veiner tool a straight knife is used to cut through the composition in order

that dead material, the parts which are not to print, may be stripped away from the base. Areas over $\frac{1}{4}$ -inch must be stripped down through the first layer of fabric to the second or to the metal. Narrower areas are stripped only to the first layer of fabric. This condition is most important. Failure to follow this instruction may result in a needed part of the design being pulled away in stripping. Other tools are used to rout between letters or in parts of the design where routing may be more efficient than stripping. After a portion of the dead material is loosened from the base it may be pulled away by hand.

Care should be taken in cutting the plate to avoid undercutting. By this is meant that the cut from the line should come on an outward slope toward the base of the plate. This condition prevents the edges of the plate from wear after a number of impressions.

The processes of plate preparation are the same whether for printing with water color or oil color inks. In either medium effective results are readily and cheaply secured.

World Trade in Reclaim¹

EXPORTS of reclaimed rubber from the United States declined from 27,707,161 pounds in 1929 to 21,209,510 in 1930, or by 23 per cent. The trade, although scattered over 24 countries, was concentrated in practically three markets.

Canada for several years has been the best outlet for reclaimed rubber produced in the United States, taking, in 1930, 14,295,140 pounds valued at \$836,283, as compared with 19,050,155 pounds valued at \$1,320,395 in 1929. The United Kingdom, a competitor, was in second place with 4,710,903 pounds valued at \$270,491, as compared with 4,865,244 pounds valued at \$329,803 in 1929. Australia was a poor third market in 1930, taking 569,687 pounds valued at \$34,664. Other principal markets were the Netherlands, Japan, Mexico, Germany, Argentina, and Spain.

WORLD EXPORTS OF RECLAIMED RUBBER

Country	Pounds					
	1925	1926	1927	1928	1929	1930
United States	10,239,876	12,075,640	19,130,429	22,452,956	27,707,161	21,209,510
United Kingdom	3,574,900	4,582,500	5,680,900	4,768,100	5,109,200	3,473,000
Germany†	865,070	3,879,040	1,958,254	3,071,054	1,335,183	1,345,762
Italy	323,768	236,710	1,098,694	297,675	430,857	157,586
Netherlands	15,686	6,065	130	2,204	143,260	24,244
Sweden‡	604	6,453	17,632	31,411	22,893	§
Poland			3,306	3,306	§	§

*Estimated.

†Contains some soft rubber paste, but mostly reclaimed.

‡Includes crude rubber, if any.

§Not available.

The declared exports from the United Kingdom in 1929 were 5,109,200 pounds, and though the exact figures for 1930 are not available at present, they are estimated at 3,473,000 pounds. In 1929 Germany was the best outlet, taking 1,797,100 pounds valued at £37,787. Spain was a poor second, with 314,100 pounds valued at £8,170, followed by Poland and Danzig, with 271,400 pounds valued at £5,696, and Finland with 166,500 pounds valued at £3,372.

Exports of reclaimed rubber from Germany increased from 1,335,183 pounds in 1929 to 1,345,762 pounds in 1930. The best outlet for German reclaimed rubber in 1930 was France, with 191,700 kilos, followed by Czechoslovakia, 115,200 kilos. Peculiarly, the United States was the third market, taking 111,500 kilos. All other markets were comparatively small. The fourth being Rumania, with 59,600 kilos. The remaining outlets in the order of importance were Yugoslavia, Belgium, Switzerland, Canada, the Netherlands, Italy, Denmark, Austria, and the United Kingdom.

¹Harry W. Newman, Rubber Division, in *Commerce Reports*.

Cooperative Marketing Coming

Centralized Sales Control Seen in Evolution of Rubber Manufacturing Industry, With Individual Enterprise Unhindered—How Coordination Works in Other Lines

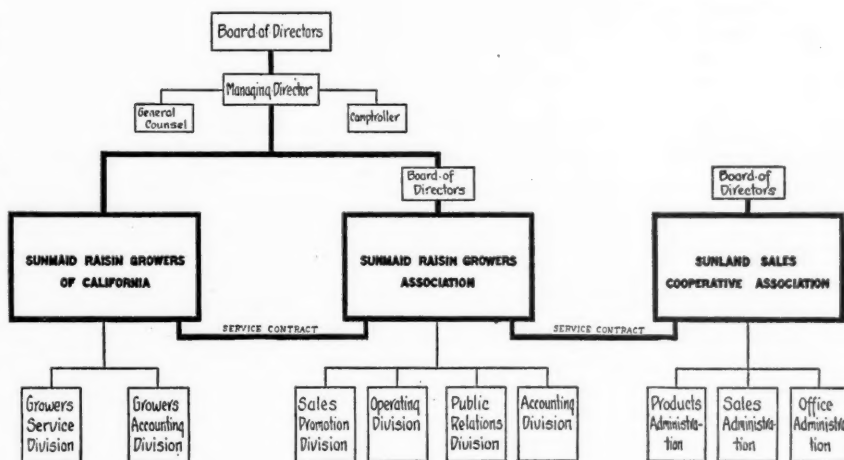
THE impression is growing among observers of the rubber manufacturing industry that the next great step in its evolution will be the development of cooperative marketing for many of its major products, but which, despite its centralized sales control, will still allow the freest play of individual enterprise. The general objects sought would be the elimination of much lost motion in distribution, the maintaining of prices at a reasonable range, the prevention of overproduction, and the adjusting of competition so that it will cease to be a mere uneconomic swapping of customers, which, even while it may result in increased volume, is nearly always procured at greater proportionate expense.

Rubber manufacturers, it is held, have much more in common than most of them realize, and their problems are not very different from those in other industries. They are all vitally concerned about an ample supply of basic material at a reasonable price, and in recent years they have even formed buying pools to insure plenty of crude rubber on fair terms. In the selling of tires abroad they have found much advantage in operating as a unit under a federal law which sanctions export combinations. They have learned many of the benefits of collective action in the workings of the Rubber Manufacturers' Association of America, not to mention numerous other trade associations and business combinations in this country as well as the various European cartels that profitably trade in various products. Hence many see no reason why a workable scheme can not be devised whereby a much better trade status will be insured the makers of tires and a wide variety of rubber goods.

Tempering American Individualism

As has been pointed out by a leading rubber authority¹, "The interdependence of individuals, companies, industries, and countries demands cooperation of a kind that is new to the average American, whose background is that of American individualism. Our history and background have

¹ E. G. Holt, Chief, Rubber Division, Bureau of Foreign and Domestic Commerce, United States Department of Commerce, in an address before the Akron (O.) Export Club, June 24, 1931.



Organization Chart of the Sun-Maid Raisin Growers of California

which we have been unaccustomed. It is going to be our job to learn how we can cooperate, while preserving that individual opportunity that is the keynote of our progress, and without too great a dependence on government assistance which might lead to government regulation and direction."

Team Work by Companies

"Our individual companies have built intensely strong organizations through team work without individuals surrendering their individual freedom of opportunity. It seems to me that an industry is capable of similar team work, preserving at the same time the individuality of component companies. This seems to me the problem of many industries and it has not yet been solved satisfactorily by any industry. It is not going to be worked out overnight, but it will come gradually. That our individualism is not necessarily opposed to combined planning and collective action is shown both by our trade association activities and by the interchange of technical information between factories to a greater extent than in European countries.

"To work out this new theory will require leadership of a kind that Americans are unaccustomed to. It will be done by a process of evolution and not by revolution. I have often thought that probably no president of the United States ever entered upon his job fully qualified in experience, knowledge, and character, but most of them have risen to the emergency and outdone themselves. The Alexanders, Caesars, and Napoleons of history were great because they grew in stature to meet the needs of their times. Men undertaking a new task are bound to make mistakes, but they learn from experience."

Occasion Develops Leaders

"Just as increased demand for any commodity of trade
(Continued on page 58)

trained us to accept individual responsibility and to expect rewards in proportion to our genius, our ambition, and our ability to work, with the limitation that at every stage we must successfully meet the competition of other individuals.

"There seems to be a growing need of coordinated activity and cooperation of a kind to

Golf Ball Dynamics

Factors Controlling the Mechanics of a Golf Ball in Play

I. T. Gurman

IN A previous article¹ the writer dealt with the effects of the change in size and weight on the behavior in play of the standard U. S. G. A. golf ball. In it he referred in part to the influence of the moment of inertia and the energy of rotation.

A more comprehensive consideration will be given here of these and other factors that influence the mechanics of the ball during the various stages of play, and due credit or discredit given to the distortion, modulus of elasticity, construction, and

The usual construction of a golf ball is shown in Figure 1. The innermost section A, called a rubber or liquid center, depending on its nature, usually a vulcanized semi-hard rubber or it may be a combination of the two materials, especially in the case of floaters, are merely a ball of scrap rubber thread or band, either pure gum or loaded.

The liquid center consists of a hollow flexible sphere, of compounded rubber, or cellulose derivative, filled with a fluid material called the "liquid." This is rarely an actual liquid although some imported balls contain true liquid-filled centers: instead it is a limpid paste or colloidal material consisting of a solid disperse phase and a liquid dispersion medium. This is comparable with the rubber center, which is similar except that the dispersion medium is a solid.

Following the center comes a section of pure gum thread B, wound under tension. This may consist of one type of thread with a cross section from $\frac{1}{16}$ -inch to $\frac{1}{8}$ -inch in width and from 6 or 8 to 20 or 22 thousandths in thickness, or it may be made up of a series of windings of pure gum stocks of approximately the same thickness but of widths varying from that of fine thread to $\frac{1}{2}$ -inch tape, applied in the order of widths, with the widest innermost and the narrowest outermost.

Then comes a section of balata-rubber mixture C, compounded to comply with gravity, color, toughness, or cost standards, and finally the paint, D, is applied in a series of fine coats by spraying or dipping.

From a manufacturing viewpoint these sections have the following purposes: the center, to attain proper finished weight and to start the winding on; the winding, to attain volume and hardness; the cover, to protect the winding and to attain size and design; and the paint, to make a good-looking finished job. From a kinetics point of view these

parts do not function in so simple a fashion. Every part of the ball, and sometimes the "subpart" (if the term may be used), has its purpose of existing and its part to play. A consideration of the ball in play reveals that not only has each intrinsic part of the ball its effect on the ball's behavior, but the constitution of the ball as a whole, both from a reactance and an inertia point of view, has an important influence on the results obtained in play.

The flight of the ball is of major interest and, of course, of major importance. Energy is imparted to the ball by the club head in two forms, impact and energy of rotation. The former is diverted into two channels, the kinetic energy or propulsion and the heat loss, or what might be considered the hysteresis loss, and the latter into kinetic energy of rotation. The ability of the ball to convert the energy imparted by impact into K.E. of propulsion (or what is popularly termed the "liveliness" of the ball) does not depend upon its ability to distort. It depends on two things: first, its elastic efficiency or mean modulus of elasticity; and second, its ability to return quickly to its original shape. Nor is the amount of its distortion a measure of its liveliness. In



Fig. 1

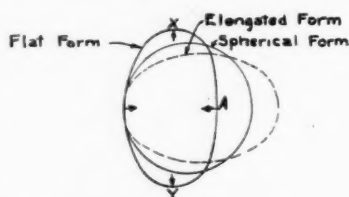


Fig. 2

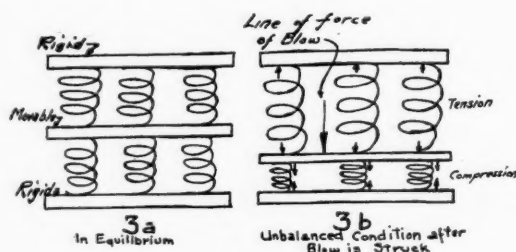


Fig. 3

fact we may say that to some extent the reverse is true.

When a ball is struck, the energy imparted by the blow is absorbed through the distortion of the ball, partly by compression and partly by tension as indicated in Figure 2, in the same way that a series of springs supporting a platform in equilibrium would be affected by a blow struck on the platform. See Figure 3 a and 3 b. As the ball distorts and then returns to shape, energy is lost because of internal friction. In the center this takes place between particles ranging below 1μ in diameter and is largely intra-molecular. In the thread in addition to the intra-molecular energy loss there is an intra-sectional friction loss. Consider Figure 2. The section at A is under "compression" while the sections at X and Y are under "tension" as compared to their original states. Actually, of course, the former owing to the compressive effect, is under lesser tension than originally while the latter is under greater tension.

This condition produces a slipping of adjacent layers of thread over one another. In two similar balls wound under different tensions the amount of this slippage will be different. First, the thread in the ball wound under greater tension, being already under greater stress, will be strained to a lesser

¹ "The New Standard Golf Ball and Its Behavior in Play," INDIA RUBBER WORLD, May 1, 1931, pp. 63-64.

degree than that in the ball wound under lesser tension, when both balls are subjected to similar impact. This condition is evident from a consideration of the decrease in the slope of a stress-strain curve as the stress increases. Second, the pressure exerted by each layer of the tensioned thread on the layers underneath is greater in the ball wound under greater tension. Both these conditions tend to lessen the slipping and, consequently, the intra-sectional friction, with a resulting higher value for the mean modulus of elasticity.

It becomes necessary to state at this point that the term "modulus of elasticity" is not used in its narrower sense as applied in the case of the Young's modulus. It is used here to indicate a measure of efficiency of elasticity, and is the ratio of induced energy to imparted energy. The mean modulus of elasticity is that of the ball considered as a whole.

The cover tends to reduce the mean modulus and, consequently, the liveliness of the ball in two ways. First, when the cover is molded on to the ball, the latter is subjected to pressure, decreasing the tension on the thread, which is again decreased when the coverstock cools and shrinks, exerting further pressure on the windings. Second, in the aging of the ball the balata in the coverstock becomes converted into a crystalline or pseudo-crystalline form, increasing internal friction. In this case, as is true also in the case of the center, the composition of the stock plays a part. As far as the cover is concerned, it is sufficient to say that, while the modulus of elasticity of the balata is lower than that of the wound ball considered as an entity, it is greater by far than that of any of the other ordinary constituents of the coverstock. Hence a high balata content in the cover stock increases the "speed" of the ball.

The pattern or design of the markings in the cover plays its part too. Since a golf ball is a sphere and since it is impossible to project it without spinning it, this means is taken to break up the pressure bankings that form on the ball as it travels through the air.

Then comes the paint, which is to the golf ball manufacturer what the proverbial charity is to those who have sins to cover, because the paint job can, and quite often does, cover a multitude of things that are better covered. Roughness, imperfections, and defacements of the molds leave their mark on the molded ball as do the imperfections produced in molding, buffing, chemical treatment, and handling. Some balls, molded with white coverstock, become discolored in handling or chemical treatment, others are molded with dark or intentionally colored coverstock. What a boon a good paint job is to the manufacturer, and what a blessing to the player! Nor is this so merely because a poor paint job might act as an intangible "mental hazard." The reason is more concrete. By reducing air resistance a good paint job actually increases the distance of flight.

When the club head strikes the ball, it deforms it as indicated in Figure 4. For a short interval of time the ball and the club head move forward simultaneously. Then the ball begins to revert to its original shape, starts to revolve, and moves forward. The effect of the "follow through" is to increase the period of simultaneous travel and increase the speed and consequently, the energy of rotation of the pro-

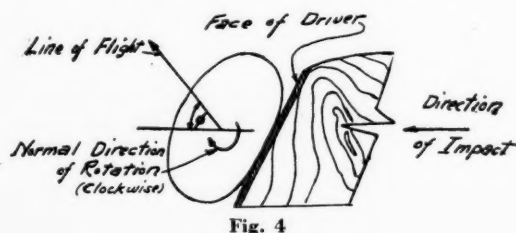


Fig. 4

pelled ball. In considering the analogous condition of the effect illustrated in Figure 3, a and 3b it becomes apparent that before equilibrium can be obtained the springs must oscillate through alternating conditions of compression and tension. Similarly the ball must pass through alternating stages during which its contour changes from the flat or onion shaped form to the elongated or lemon-shaped form, and back again. See Figure 2.

Without delving too deeply into the mechanics of the process through which the ball must pass before returning to its spherical shape, it is evident that for a short period of time after the beginning of its flight the ball travels through the air in a distorted form. The mass and the volume remain the same, but the surface area and the angle of approach of the surface to the air column are both increased. Since the energy absorbed during this period, to overcome air resistance, is a function of both these factors and that of time, it is readily seen that the ball which deforms least and returns to its original shape soonest, loses the least energy due to abnormal air resistance during the early part of its flight.

If air resistance were neglected, the K.E. of a projected ball would be the same at the end of its flight as at the beginning provided this flight took place along a horizontal plane or fairway. In other words *no energy is absorbed in transferring the ball horizontally*, regardless of distance. What controls the distance attained is the time the ball is in the air and the rate at which it travels forward. The general formula is $R = 4h \sin \phi \cos \phi$, or $R = 2h \sin 2\phi$, where R is the horizontal range, ϕ is the angle of propulsion,

V^2
and $h = \frac{V^2 \sin^2 \phi}{2g}$. For maximum value of R , $\sin 2\phi = 1$,

and $\phi = 45^\circ$, from which $R = 2h$. Increasing ϕ increases the vertical component of the velocity ($V \sin \phi$) and increases the time of flight proportionately, but decreases the horizontal component ($V \cos \phi$). Decreasing ϕ does the reverse. Either of these results in lessened distance. Since the air has a decelerating effect on the travel of the ball, acting to reduce both the horizontal and the vertical components, the formulae must be modified accordingly, but the basic principle involved remains unaltered.

That the distance the ball travels depends on the angle of flight, as indicated above, as well as on the imparted K.E., is well known. What is not so well known is the part that the *energy of rotation* plays in the distance attained in flight.

Before treating with the actual conditions met with in play, let us first consider the following hypothetical cases. A ball is propelled with a K.E. of 975 ft. lbs. and a corresponding velocity of $141.4 \frac{1}{s}$ along a path at 45° to the horizontal. Air resistance being neglected, this will give the maximum distance for the energy expended. $V \sin \phi$ and $V \cos \phi$ will each be $100 \frac{1}{s}$. The ball will describe

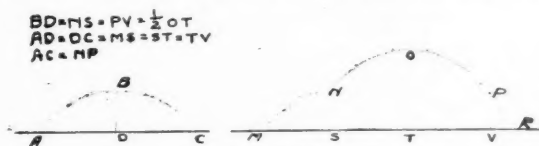


Fig. 5

a parabola, will remain in the air for 6.21 seconds, and will travel 207 yards. See Figure 5 a. Another ball is projected similarly, but at the instant it reaches the apex of the parabola, the point at which the vertical component becomes zero, an additional amount of energy equal to one half the original is imparted vertically upwards producing a new vertical component of $100 \frac{1}{s}$. The velocity of the ball and its inclination will then be identical with that at the begin-

ning of its flight, and the path which it will describe during the ensuing 6.21 seconds will be identical with that which the first ball described during the entire course of its flight. Comparing Figure 5, a and b, A B C is identical with N O P. It will then continue along the parabola N O P R and will land at R. The ball will remain in the air a total of 10.59 seconds, rising for 6.21 seconds and falling for 4.38 seconds, and will travel a horizontal distance of 353 yards. A third ball is projected with K.E. equal to the total energy imparted into the second ball but applied entirely at the start as was done in the first case. The velocity of the ball will be 173.2 ft. per second; the rectangular components will each be a $131.6 \frac{1}{s}$; the ball will stay in the air 7.07 seconds and will travel a horizontal distance of 310.5 yards. Comparing the second and the third cases, in each of which the energy is 50 per cent greater than in the first case, we find the gain in distance to be 70.7 per cent and 50 per cent respectively. Thus by applying the same energy in a different manner we have affected the magnitude of the flight of the ball. The difference in distance is represented by VR.

(To be continued)

Cooperative Marketing Coming

(Continued from page 55)

results in increased supply, so the demand for a certain kind of leadership will result in its evolution. The lions and the lambs will not lie down together at once, but the right kind of leadership is going to be gradually developed, partly by present leaders learning new methods and partly by the development of new talent. Business cooperation, of a kind quickly responsive to consumers' needs and based on practical economics, will be superior to any other kind of centralized control and will leave open the door of opportunity and the possibility of individual achievement that is the necessary spur to hard work and inventive genius."

Many non-competing units in various lines regard joint merchandising efforts as the best safeguard against the encroachment of mergers and chains. The Sun-Maid Raisin Growers' cooperative plan is an excellent example. Furniture manufacturers specializing in different lines, for instance, are said to get a surer and more economical control over marketing by operating a sales force jointly. Eight soap-making concerns have successfully pooled their issues on a by-product—glycerine—as an anti-freeze preparation for automobile radiators, maintaining a research department to develop, if possible, a better product and new uses. Close cooperation is maintained among jobbers, dealers, and the cooperating companies' sales and advertising departments. Proportionate cost is comparatively light.

Increasing Consumer Demand

More than ever the cooperative objective seems to be the increasing of consumer demand or the extension of the market for products by jointly developing new outlets. Food manufacturers with various specialties successfully carry on together campaigns to increase consumer demand. While cooperative schemes feature joint advertising and publicity programs, some go even further and cover the whole field of advertising and sales promotion, as in the case of the linen industry.

The latter was steadily losing to cotton, but through united effort it has come back strong. The Guild through which it operates includes some sixty foreign spinning and weaving concerns with several large American wholesale dry goods firms as associate members. Formed tentatively in 1923 for

three years, it was decided in 1926 to continue the Guild indefinitely.

Clothing and Fertilizers

Leading American clothing manufacturers have in "The Men's Apparel Group" leagued to remind men constantly of the need and advantage of good dress and how best to improve their wardrobe for each season. Yet there is no concerted propaganda against shabby, unsafe, or uncomfortable tires, much less any general educational campaign to promote the sale of other rubber goods.

Some fertilizer manufacturers have even successfully enlisted the cooperation in a selling educational campaign of farm implement concerns, nurserymen, and makers of power pumps and cement pipe. A few years ago Wisconsin concrete products manufacturers ended a long and disastrous price war by forming a central marketing organization, which maintains an effective selling organization with a credit and collection department.

Quick Vulcanite Curing

While accepting the dictum that while accelerators speed up the soft rubber vulcanizing reaction, they have practically no effect on the hard rubber reaction, a dental vulcanizing experimenter is nevertheless puzzled as to how he chanced to cure a small batch of hard rubber compound in 15 minutes at 320° F., instead of the usual 2 hours at 300° F., as indicated for thick plates.

Shaped as a 3-inch cube, he had left the compound in superheated steam in a thin zinc container within an ordinary copper-lined dental vulcanizer. Although, insofar as he knows, the compound contained no accelerator, the cure was thus swiftly effected, and the product was a perfect vulcanite by all ordinary tests. In the process the zinc container was nearly consumed by what appears to have been sulphurous acid, and the speedy curing the experimenter attributed to zinc sulphide formed by the action of the acid. The fact that the copper lining of the vulcanizer had also been much corroded, evidently electrolytically, discouraged more experimenting.

Filling and Service Station Sales

Interesting and important information concerning the sales possibilities of filling and service stations was revealed in a survey made of 1,000 such stations taken at random from the paid circulation of *The Gasoline Retailer*.

Owners of the 26,000,000 motor vehicles in the United States make an annual average expenditure of \$105 for fuel and lubricants; \$82 for repairs and maintenance; \$55 for replacement parts; \$34 for tires; and \$24 for accessories.

Tires are sold by 536 stations making a business of soliciting their customers for tire replacements. Certain of the major gasoline companies are now in the tire business and have their tires manufactured for distribution through their owned or controlled stations. The tendency of the motorist is to do his tire trading at service stations rather than at the tire specialized store.

Accessories are stocked by 725 stations covered in the survey for the same reason that tires are handled. Some of these operators declare they make more profit from the accessories business than from sales of gasoline and oil and maintain that they should be better distributors of accessories than the specialized store. More than 246 station owners said they are looking for additional accessories to sell, and all of them expressed eagerness to handle any item of ready sale to motorists visiting their stations.

Rubber Backed Rugs

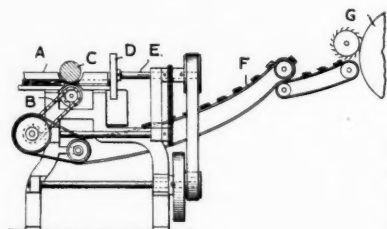


Fig. 1. Fiber Cutter

THE introduction of latex and water dispersions of rubber compositions has added new rubber working methods to the technology of the industry. Rubber, in consequence, is being utilized in new ways and in products where by the old methods rubber could not be used. Examples are found in the textile, carpet, and rug industry. In the production of certain types of these goods methods have been patented for the use of both latex and water dispersions of rubber. Several of these applications have been described in this journal.¹

In the present article the method of manufacture is outlined as found in a recent patented process of non-woven pile rugs in which dispersed rubber composition is used to anchor the pile to a burlap back foundation.²

Preparation of Fiber

Hemp, jute, wool fiber, or other suitable material that is to form the nap or pile of the rug is first reduced to 3-inch lengths in the fiber cutter as illustrated in Figure 1. The material to be cut into lengths is fed into a guideway A from which it passes between rollers B and C, which feed the material into position to be cut. The knife consists of a bar D fixed at its center to a shaft E and having a cutting edge on each end which cooperates with a stationary plate to cut the fiber.

The speed of the rollers is regulated so that they feed the fiber forward about 3 inches between every rotation of the knife. The cut material falls to a traveling belt or apron F, which conveys it to a cone duster G or similar device for effecting preliminary shredding of the fibers.

Garnetting

The material from the cone duster passes to a feeder, Figure 2, A which delivers it to an apron B. The latter supplies it to the garnetting machine C for fine shredding and delivery onto the apron D as a fine bat suitable for application to the burlap base to form the nap of the rug. From apron D the bat passes through a reciprocating blamire E, which doubles the bat back and forth upon itself until it attains the desired thickness. The bat thus produced is wound upon rollers for storage and for convenience in applying the bat to the base of the rug.

The application of the bat to the base is effected con-

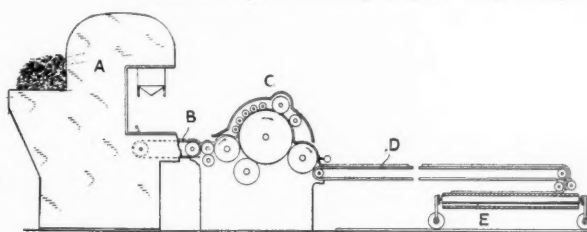


Fig. 2. Garnett Machine

tinuously by a needling machine after the plan shown by Figure 3. This machine consists of a reciprocating frame A carrying a large number of needles B with downwardly extending barbs. The fibers of the bat C engaged by the barbs are forced through the burlap D producing a nap of the fibers upon the opposite face of the burlap. These sheets of rug making material are ordinarily about 100 yards in length and may be secured together at their ends so that the operation can be carried on continuously. In order to produce a better nap on the

rug the sheet of needled burlap is turned over and a second bat is needled through from the opposite face of the burlap.

Structure of Needled Fabric

The fabric structure after the second needling, is shown in Figure 4. The fibers are forced through the rug so that the ends of the fibers which projected from the face of the rug in the first operation are turned back upon themselves and add to the nap formed from the bat A of fibers applied to the opposite side of the rug.

One face of the rug thus consists largely of loops of the fiber to which the backing B material is applied to hold the fibers in place.

Blotching

Following the second needling the rug making material is passed to the blotching machine, Figure 5, where it passes over roller A and

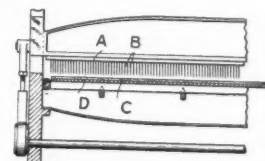


Fig. 3. Needling Machine



Fig. 4. Structure of Needled Fabric

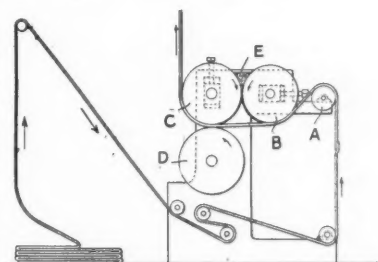


Fig. 5. Machine for Blotching and Applying Rubber Dispersion

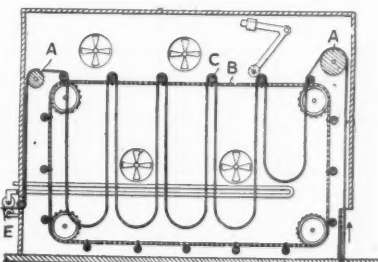


Fig. 6. Drier for Drying Blotch and Curing Rubber Backed Fabric

¹ "Liquid Rubber and Textiles," Jan. 1, 1931, pp. 53-54; "Liquid Rubber and Carpets," Mar. 1, 1931, p. 56; "Latex Treated Carpet," May 1, 1931, p. 60.

² United States Patent No. 1,815,586, July 21, 1931.

beneath rollers B and C. The pressure roller D forces the material into contact with the lower face of C so as to press the blotching material into the base of the rug and into contact with each of the fibers on its upper face. The blotching material is supplied to rollers B and C on their upper face and in the trough E formed between them. The pressure of roller D forces the blotch into the burlap so that when dry it seals the face of the rug, preventing the liquid backing material, Figure 3, B, from penetrating to the printed face of the rug and discoloring the fibers.

The blotching material consists of a gum mixture to

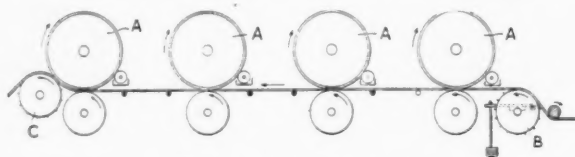


Fig. 7. Printing Machine

which coloring material is added. The blotch gives weight or body to the rug. From the blotching machine the goods are festooned for drying in a fan ventilated drier, Figure 6.

Rubber Backing

After drying, the material is put through a second machine similar to that shown in Figure 5, for applying a coating of water dispersed rubber composition to lock the fibers into the burlap so that they cannot be loosened or removed in service.

The rubber dispersion contains a small percentage of a spreading material such as gum tragacanth added to increase the flowing qualities of the mixture. The backing material contains about 53 per cent of solids. It impregnates rather than coats the back of the rug so that the fibers are securely held in place, but the presence of the blotching material applied to the opposite face of the textile effectively prevents the backing from penetrating the rug or discoloring the fibers.

Drying and Curing

The sheet material is again dried for removal of the moisture and curing the backing, using the type of drier shown in Figure 6. The drying temperature is maintained at about 212° F., and the sheet is drawn into the drier by means of a hackle roller, Figure 6, A, which engages the material on the opposite face from that to which the backing has been applied. A chain B carrying rods or pipes C, etc., upon which the material to be dried is hung in festoons, passes upwardly beneath the hackle A and forward across the upper portion of the drying chamber. The material fed into the chamber by roller A falls in the form of a loop between the successive pipes carried by the chain B.

In connection with festooning, a tripping device is employed to regulate the loops to proper and uniform length. At the opposite end of the drier a hackle roller D removes the dried material from the festooning device at a rate equal to that of its introduction by roller A. The material then passes out at an opening at the lower portion of the drier, and the edges of the rug are trimmed off by a rotary knife E to reduce the material to the desired width.

Printing

The next operation is printing a design over the base color of the web. The work is done in a machine, Figure 7, consisting of a series of printing rollers A. A hackle roller

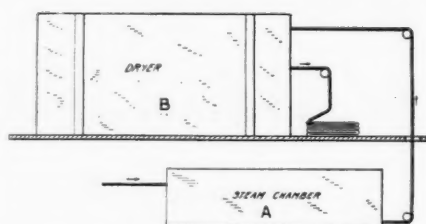


Fig. 8. Drier and Steam Chamber

B engages the rug material for applying a definite tension while printing, and a hackle roller C applies an equal tension to the goods as they are drawn from the printing machine. Following the operation of printing the design the material is steamed by passage through a steam chamber A, and drier B Figure 8, to set permanently the colors in the nap.

The final operation is to cross-cut the finished roll into pieces of definite rug length. This operation is effected on a table arranged

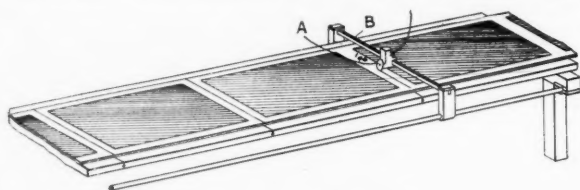


Fig. 9. Rug Cutting Table

as in Figure 9, using a motor driven rotary blade A operating in a guideway B for accurately cutting the rugs apart.

Rubber Flooring Experiments

Allan Williams

IT IS safe to say that 95 per cent of the rubber flooring laid today is square cut tile although some companies still make and sell molded tile for new jobs as well as for repairs. The first rubber tiling laid in this country some 35 years ago was interlocking tile and is still in use, showing a small degree of wear. But tests have revealed that 85 to 96 per cent of hardness is found in this type of tile. One of the main qualities of rubber flooring should be softness under foot and durability. This has been shown by wear and experience although rubber flooring of less than 50 per cent of softness has not proved a success. The average resiliency of 70 to 75 per cent has proved the most practical hardness for rubber flooring, taking a formula of 0 to 100.

The competition of the square cut tile and cheap cushion back tile has gradually made obsolete the molded rubber tile because of its cost. The consumer of today is first interested in price, second, beauty, and then durability.

Certain cements have been developed, some of asphaltic and latex mixtures, but the most successful have been composed of an alcoholic mixture as this will not affect the light colored tile nor is it affected by water when once dry. Too much or insufficient cement gives poor adhesion.

Eighty per cent of rubber flooring troubles are due to poor workmanship from open joints, too much pressure, damp underfloors, insufficient tests of dry underfloors, poor stretching and tacking of cloth and felt on wood floors, cracks not properly filled on concrete, shrinkage of wood underfloors, and many other things that only years of practical experience can overcome.

Ten per cent of the trouble is due to cements not adhering properly caused by overheated underfloors, stale cements, and improper thickness of cement coating. The other ten per cent is due to cheap rubber compounding, improper undersurface for proper adhesion to underfloor, expansion of rubber when excessive water is used in cleaning because of high contents of latex, improper cleaning methods, use of strong alkali cleaners, abuse by heavy indoor trucks or gouging by sharp implements; bloom, owing to excess of sulphur, unpleasant odors, fading colors caused by sun and water, poor aging quality, and too much porosity.

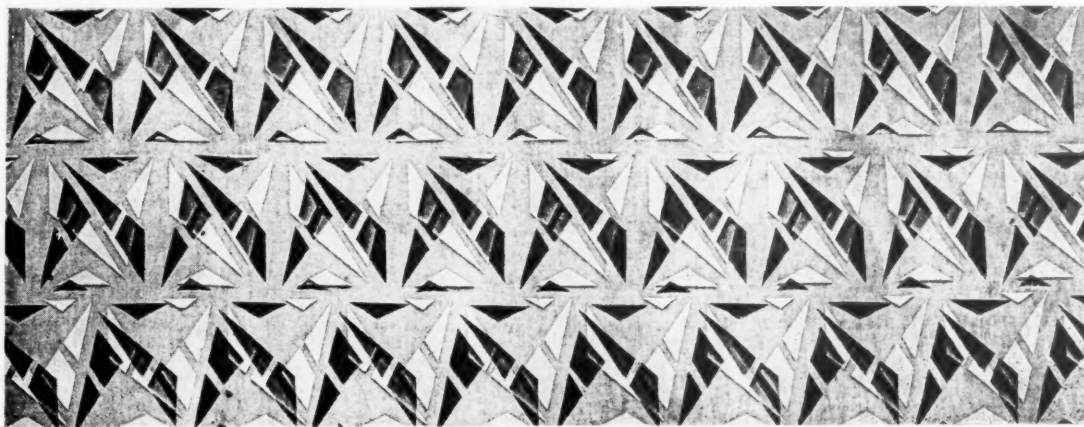
New Spreader Application

Applying Designs to Proofed Fabrics

IN THE art of waterproofing cloth it is common practice to apply one or more thin layers of rubber cement to the fabric by passing the cloth over a spreading roller and beneath a fixed doctor blade. The latter is set parallel to the roller and firmly against the cloth. In this position a mass of soft rubber composition is applied to the upper surface of the cloth. The latter in its passage under the doctor blade draws the rubber mixture with it, thus forcing the plastic material into the cloth and leaving a thin adhesive film on its surface. In this way successive layers of rubber may be applied to build up a composite coating as thick as

drawn through the aperture. If the doctor blade is pressed firmly against the sheet, forcing it close to the plain portions of the stencil, the deposit of the coating material will be very thin. By very close setting of the blade the sheet may be left entirely free from any deposit whatsoever in these areas.

The stencil may be of the ordinary type having the desired pattern formed by perforations, or the stencil may merely bear the pattern depressed into its surface in intaglio or formed upon its surface in cameo relief. If a perforated stencil is used, the perforations of the pattern will permit



Stencil Design Applied on a Rubber Spreader

desired. The coating is thus evenly distributed over the entire surface; consequently only plain colored sheets are produced, and no pattern is obtainable by this method.

By a new process¹ definite patterns or designs may be produced in the spreading operation as follows: A flat sheet of cloth is drawn between a doctor blade and a spreader roller covered with a relatively rigid stencil sheet. The plastic spreading material placed as usual on top of the cloth will be applied by the pressure of the doctor in accordance with the pattern of the stencil. In a similar way a pattern can be transferred to the cloth from a relief pattern encircling the spreader roller. The upper surface of the coating material is determined by the straight edge of the doctor blade; while the depressed or cutout areas of the stencil permit the overlaying sheet to yield to the constricting pressure exerted upon it by the plastic material as it enters between the doctor blade and the spreader roller.

Important Factors

The depth to which the sheet is thus depressed will be determined by the following factors: size and depth of the relief or cutout portion of the stencil; plasticity of the compound used; spacing of the doctor blade; elasticity of the fabric under treatment; and the tension under which it is

drawn through the aperture. If the doctor blade is pressed firmly against the sheet, forcing it close to the plain portions of the stencil, the deposit of the coating material will be very thin. By very close setting of the blade the sheet may be left entirely free from any deposit whatsoever in these areas.

A number of layers of the material may be applied before the design layer, and successive matching or overlapping design layers in different colored mixtures of different materials may be applied.

Designs in Color

The accompanying illustration shows a sample of proofed sheeting upon which the design was produced by spreading a colored rubber cement according to the method described. This method was the outcome of an effort to obtain printed sheeting without investing in a printing machine. Naturally the results obtained with a printing machine are much superior to that of the spreading method, but for certain work the latter type is satisfactory. The finer the count of the sheeting the better will be the effect of the printing process.

¹United States Patent No. 1,812,587, July 7, 1931.

Rate of Deposition of Latex on Porous Molds¹

H. W. Greenup²

THE manufacture of rubber articles by dipping porous forms in latex was first described by Condamine³. He reported to the Paris Academy in 1736 that the natives in South America made such articles as shoes and bottles, using clay molds which, after drying of the deposited layer, were shattered and removed. The idea of making articles by a process of this sort, instead of by coagulating the latex, milling, and then shaping the milled rubber, appeals to the imagination. Increased tensile strength and improved aging have been claimed⁴ for articles made directly from latex, and their remarkable resistance to tear, obtained under certain conditions, is well known.

In more recent years there has been a revival of interest in this method of manufacture, to judge by the number of patents issued. Ditmar⁵ and also Hopkinson⁶ have patented a process for making articles such as surgeons' gloves, inner tubes, etc., by deposition on porous forms. Venosta⁷ used concentrated latex to lessen the number of dips necessary with a non-porous mold. The Dunlop company⁸ has attempted to hasten deposition by using a porous mold filled with a coagulant-containing gel; while the Anode Rubber Co.⁹ has impregnated the mold with a coagulant which diffuses outward through the still permeable, coagulated layer. Hauser¹⁰ has used filtration through porous ceramic filters as a method of concentrating latex, but he states¹¹ that there are too many drawbacks to permit its being used commercially on the plantations. However Stevens¹² is of the opinion that systematic experiments with differently prepared collodion filters might yield a method of quickly and cheaply filtering, and thereby concentrating, latex.

Latex usually contains particles varying in size from 0.5 to 3 μ , with some of ultra-microscopic size. As the average pore size of an ordinary grade of filter paper is 3.3 μ ¹³, latex passes through unchanged until a sufficient number of particles have been adsorbed on the pore walls to cause stoppage. This is not the case with unglazed porcelain filters of the Chamberlain type, where the size of the largest pores is from 0.2 to 0.4 μ ¹⁴. It would seem that filtration would be fairly rapid at first, but would become slower with increasing resistance to flow of serum through the deposited layer. Undoubtedly some of the ultra-microscopic particles

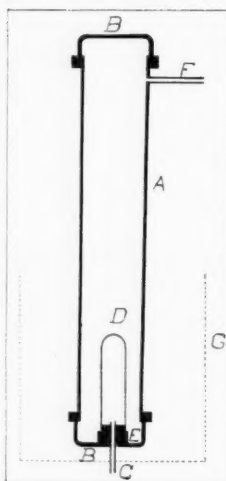


Fig. 1. Deposition Apparatus

would be drawn into the pores and, being adsorbed on the walls, contribute to the decrease in the rate of filtration. Another factor to be considered, especially when working with pressure, is the deformability of the latex particles.

In view of the fact that the literature offers no detailed information as to the effects of pressure, temperature, rubber concentration, or hydrogen-ion concentration, the effect of these factors on latex deposition on porous molds was investigated.

Experimental Procedure

The apparatus illustrated in Figure 1 was used. It consisted of a 24-inch (68.5-cm.) piece of galvanized 4-inch (10.15-cm.) pipe, A, closed at each end with caps, B. A 0.25-inch (6.35-mm.) pipe, C, led from a vacuum line through the bottom cap to the porous mold, D, to which it was joined by means of a rubber stopper, E. A 0.25-inch (6.35-mm.) side pipe, F, permitted the entrance of air either at atmospheric or higher pressure. When working above room temperature, the water jacket, G, was added.

The porous molds were alundum extraction thimbles of medium porosity. They were 45 mm. in diameter and 127 mm. in length. Thimbles of coarse porosity allowed some latex to pass through, but those of medium porosity did not. They were relatively uniform, would stand an external pressure of at least 35 pounds per square inch (2.46 kg. per sq. cm.), and could be easily cleaned by ignition in a muffle furnace.

In performing the experiments the mold was first wet with water to prevent the formation of an impermeable, dehydrated layer, the latex added, and the top cap screwed on. After deposition the top cap was unscrewed, the latex poured out, and the bottom cap and the connected mold removed. The deposited layer was dried at 60° C., and its thickness determined.

Suction was applied to give pressure differences up to 7.5 pounds per square inch (0.52 kg. per sq. cm.) and above that air pressure was also used. All pressure differences were recorded as "pressure" whether due to a partial vacuum in the mold or a partial vacuum and air pressure on the latex.

Ammonia-preserved latex, containing 1 per cent ammonia and 35 per cent rubber (by coagulation), was used unless otherwise stated.

Time Required for Deposition

A preliminary experiment to determine the time necessary to obtain a deposit of appreciable thickness was first made. The results are shown in Table I.

¹ Presented before the Division of Rubber Chemistry at the 81st Meeting of the A. C. S., Indianapolis, Ind., Mar. 30 to Apr. 3, 1931. *Ind. Eng. Chem.*, June, 1931, pp. 688-91.

² Firestone Tire & Rubber Co., Akron, O.

³ Hauser, "Latex," p. 3, Steinkopff.

⁴ Hauser, M. I. T. Lectures, 1928.

⁵ Ditmar, British Patent No. 214,224 (1924).

⁶ Hopkinson and Gibbons, U. S. Patent No. 1,542,388 (1925).

⁷ Venosta, British Patent No. 233,458 (1924).

⁸ Dunlop Co., Ltd., British Patent No. 285,938 (1926).

⁹ Anode Rubber Co., British Patent No. 252,673 (1927).

¹⁰ Hauser, German Patent No. 412,060 (1923).

¹¹ Hauser, *op. cit.*, p. 121.

¹² Stevens, "Latex," p. 21, British Rubber Growers' Assn.

¹³ Ostwald, "Fischer's Handbook of Colloid Chemistry," p. 263, Blakeston.

TABLE I. EFFECT OF TIME ON THICKNESS OF DEPOSIT

Pressure, 7 lbs. per sq. in. (0.52 kg. per sq. cm.)	
Time Minutes	Thickness of Deposit Mm.
30	0.3
45	0.55
840	1.38
1,020	1.5

These preliminary tests demonstrated that deposition of this sort is too time-consuming to be considered commercially feasible. As expected, the rate of deposition was more rapid at the start than later, a deposit of 0.55 mm. being formed in the first 45 minutes, while the increase in thickness was only 0.12 mm. between 840 and 1,020 minutes.

Effect of Pressure

The effect of pressure was first determined in attempting to hasten deposition. The pressure was first kept at 5 pounds per square inch (0.35 kg. per sq. cm.) for 3 minutes and then increased the desired amount. This prevented latex particles from being forced into the pores of the mold at the start, a condition which would have decreased deposition considerably. The results are shown in Table II.

TABLE II. EFFECT OF PRESSURE ON DEPOSITION

Time, 30 minutes		Thickness of Deposit Mm.
Lbs. sq. in.	Kg. /sq. cm.	
7.5	0.52	0.3
12.5	0.88	0.2
17.5	1.23	0.5
35	2.46	0.5

A pressure of 17.5 pounds per square inch (1.23 kg. per sq. cm.) caused an increase in thickness of the deposited layer of about 60 per cent over that obtained with a pressure of 7.5 pounds per square inch (0.52 kg. per sq. cm.), but a further increase to 35 pounds per square inch (2.46 kg. per sq. cm.) did not cause a corresponding increase in thickness. One trial was started at a pressure of 50 pounds per square inch (3.5 kg. per sq. cm.) but was interrupted by the breaking of the mold. Pressures up to 35 pounds per square inch (2.46 kg. per sq. cm.) did not increase the rate of deposition sufficiently to bring it into the range of practical applicability.

Effect of Rubber Concentration of Latex

In determining the effect of rubber concentration, the latex was prepared by dilution with distilled water; thus there was no change in the ratio of rubber to non-rubber constituents. The results are shown in Table III.

TABLE III. EFFECT OF RUBBER CONTENT OF LATEX ON DEPOSITION
Pressure 35 lbs. per sq. in. (2.46 kg. per sq. cm.); time, 30 minutes

Rubber Content %	Thickness of Deposit Mm.
10	0.25
15	0.25
25	0.25
35	0.3

There was no change in speed of deposition upon dilution of the latex. Some experiments were made with latex mixtures of higher rubber content, with the result that thicker deposits were formed. The latex was concentrated by the Hauser evaporation process to a rubber content of 68 per cent. It contained 0.75 per cent potassium hydroxide and 0.75 per cent potassium-coconut oil soap. This was attributed to the increased viscosity of the mixtures and corresponding tendency for increased thickness of what might be termed "the undeposited but adhering" layer.

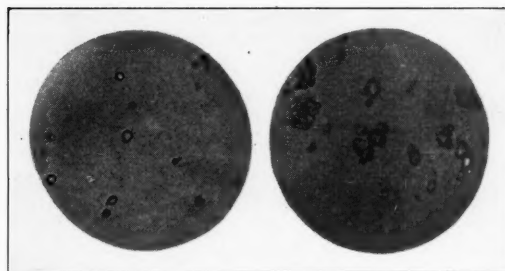


Fig. 2. Photomicrographs of Latex. 1,500 X

after the latex had reached the desired temperature⁷, pressure was applied. The results are shown in Table IV.

TABLE IV. EFFECT OF TEMPERATURE ON DEPOSITION

Pressure, 27.5 lbs. per sq. in. (1.93 kg. per sq. cm.); time, 30 minutes	
Temperature C.	Thickness of Deposit Mm.
26	0.3
38	0.4
49	0.5
60	0.5
71	0.5

It was evident that decreased viscosity of the serum resulting from higher temperatures did not increase the rate of deposition sufficient to merit further consideration. Experiments at temperatures higher than 71° C. were made, but difficulty was encountered because of the formation of a dried film at the surface of the latex. There was also some tendency for bubbles to form in the deposited layer after removal from the apparatus. Agitation would have lessened the tendency for the formation of a dried film on the latex, but not the formation of bubbles in the deposit.

Effect of Hydrogen-Ion Concentration

The effect of hydrogen-ion concentration on the rate of deposition was next investigated. As the hydrogen electrode cannot be used to determine the pH of latex mixtures¹⁴, owing partly to the deposition of rubber on the electrode, the Wulff colorimetric foil method was chosen. The foil method has the advantage of being less tedious and time-consuming than the spot-plate indicator method. An accuracy of 0.2 pH has been claimed for this method⁴, but MacKay¹⁵ has shown that there are certain ranges in which this is not true. One objectionable feature of the Wulff foil is the tendency for the indicator to diffuse into the latex especially if left in longer than 1 minute. McGavack and Rumbold¹⁶ have recently used the glass electrode with considerable success, and it seems probable that this method may overcome some of the difficulties in measuring the pH of latices.

Since latex starts coagulating at about pH 4.8¹⁷, it was necessary, in order to avoid local coagulation, to use an acid or buffer mixture which gave a pH value higher than 4.8 in the concentration used. Stevens¹⁸ has stated that it is possible to avoid local coagulation in ammonia-preserved latex when using acetic acid if dilute acid is added with vigorous stirring, but this was not the experience of the writers working with 0.5 per cent solution. Boric acid, which has a pH of approximately 5 in 1 per cent solution at 25° C., was chosen. It was later found possible to add a 10 per cent solution at 60° C. without causing local

¹⁴ Hauser, *op. cit.*, p. 94.

¹⁵ MacKay, *India Rubber J.*, No. 10 (1930).

¹⁶ McGavack and Rumbold, *Ind. Eng. Chem., Anal. Ed.*, 3, 94 (1931).

¹⁷ Hauser, *op. cit.*, p. 95.

¹⁸ Stevens, *op. cit.*, p. 9.

Effect of Temperature

As increased temperature ordinarily has a considerable effect upon the rate of filtration of liquids owing to decreased viscosity of the liquid, it seemed logical to assume that this would be the case in the filtration of latex. A water jacket was added to the apparatus (Figure 1), and experiments were made at different temperatures. The water jacket was heated with a gas burner and reached the desired temperature⁷, pressure was applied. The results are shown in Table IV.

coagulation in the latex. Table V shows the results of deposition experiments.

TABLE V. EFFECT OF HYDROGEN-ION CONCENTRATION OF DEPOSITION
Pressure, 35 lbs. per sq. in. (2.46 kg. per sq. cm.)

pH	Time Minutes	Thickness of Deposit Mm.
11.2	30	0.25
10	30	0.25
8.1	30	0.38
6.1	10	1.27

The thickness of the deposited layer was increased about five times, and the time decreased to one-third by changing the pH of the latex from 11.2 to 6.1. At the latter value there was a considerable increase in viscosity but no local coagulation. It was evident that a marked change had occurred in the properties of the latex.

The coagulation of latex has been said¹ to occur in the following steps: (1) The individual particles come together reversibly in small bunches (aggregation); (2) the small bunches come together irreversibly to form visible clumps (floculation); (3) these clumps come together to form still larger ones (coalescence); and (4) the larger clumps come together to form the coagulum. Microscopic examination indicated that the addition of sufficient boric acid to give a pH of 6.1 had caused aggregation. Floculation did not take place since it was possible to redisperse the particles by the addition of sufficient ammonia. This condition of aggregation is illustrated in Figure 2. Since the small bunches were several times larger than the original particles, they were more easily filtered out of the serum.

It was possible to wash the deposited layer by replacing the aggregated latex with water and continuing the filtration. When the mold was removed from the deposition bath but left connected to the vacuum line, there was shortly afterwards a marked decrease in thickness of the deposited layer. This condition was due to syneresis or squeezing out of the enclosed serum. The deposited layer then became compact and non-porous.

Relatively large amounts of boric acid were required to produce this aggregation, as much as 10 per cent being added to a latex containing 1 per cent ammonia, but by lowering the ammonia content through aeration this amount could be reduced considerably. The stability of aggregated latex was good, closed samples being kept as long as 12 months without appreciable change in degree of aggregation or any tendency for putrefaction.

Owing to the size of the aggregated clumps, Brownian movement was much slower or in some cases not evident. This explained the comparatively rapid creaming or separation into thick cream and clear serum layers. This cream could be redispersed by stirring.

Owing to the increased protective matter present, it was not possible to cause aggregation in concentrated latex by adjusting the pH to 6.1 with boric acid. By using Irish moss or similar materials a less complete aggregation may be accomplished. The filterability of the treated Revertex was not so great as that of the aggregated latex.

It has been found that considerable difficulty may be encountered in obtaining the exact degree of aggregation and consequent filterability when repeating experiments, especially if latices are used which have been obtained from different sources or from trees tapped shortly after a rest

(Note—Since this work was completed several patents have come to the attention of the writer. Aggregation of latex or increase in filterability, may be caused by the addition of such materials as sodium phosphate buffer mixtures, calcium and other polysulfides, clays, Irish moss, etc., according to Hopkinson and Gibbons¹⁹, Smith²⁰, and Hazell²¹. The Dunlop company²² has also patented the manufacture of articles made of organic materials from aqueous dispersions in which the organic materials have been agglomerated by various materials.)

¹⁹ Hopkinson and Gibbons, U. S. Patent No. 1,632,739 (1927).

²⁰ Smith, U. S. Patent No. 1,678,022 (1928).

²¹ Hazell, British Patent No. 295,796 (1929).

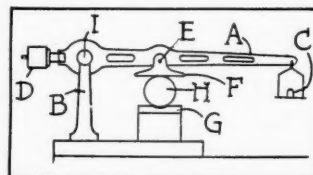
²² Dunlop Co., Ltd., Canadian Patent No. 284,565 (1928).

period. The addition of pigments will in some cases cause marked increase in the degree of aggregation. In view of these factors, the development of a process which always yields a latex in a definite state of aggregation would seem to be a difficult problem.

Testing Tennis Balls¹

French Method of Testing the Finished Ball

A TENNIS ball may be regarded as a bubble of nitrogen kept under pressure by an envelope of rubber. Its qualities depend on the amount of this pressure and the nature of the rubber. Under identical conditions any ball should travel through



Fric Plasto-Durometer

a trajectory which is always the same. In order to obtain this result all the balls should possess perfect equilibrium, weight and surface strictly the same, regular rebound, etc.

Diameter. The balls should not measure less than 0.0635 m. or more than 0.0667 m. in diameter. Measurement is obtained by two template gages made by cutting circular holes in a sheet of metal. One of these holes has a diameter of 0.0667 m., the other has a diameter of 0.0637 m. through which the ball must not pass.

Rebound. The balls shall have a minimum rebound of 1.35 m. and a maximum of 1.47 m. when they fall from a height of 2.54 m. on a cement surface at a temperature of about 20° C. The apparatus for testing rebound consists of an inclined channel to hold the balls to be tested, arranged above the cement base. A catch, operated from the ground, frees one ball at a time. The rebound is measured by comparison with a scale placed in the axis of the chute.

Deformation During Compression. The deformation should not be below 0.00806 m. nor above 0.00875 m. under a pressure of 18 pounds applied at the two extremities of any diameter, at a temperature of about 20° C. The preferred apparatus for testing deformation is a modified form of the Plasto-Durometer of R. Fric. This modification shown in the illustration comprises a lever A pivoted on the top of a pillar B, carrying at one end a balance pan C and at the opposite end an adjustable weight D. At point E a disk F is pivoted. Below F is located an anvil G hollowed on its upper surface to accommodate the curvature of the ball H to be tested.

A test is made by placing the ball on G, adjusting the lever A in equilibrium by movement of weight D.

Next a known light weight is placed in the pan C sufficient to disturb this equilibrium and insure contact of piece F with the ball H. Additional weight placed in the pan C will compress the ball, causing the lever A to incline downward at an angle α . A small concave mirror mounted at I, faces along the axis of rotation of lever A. The mirror can be regulated to reflect the image of a slit in a metal encased electric light against a transparent scale placed in a vertical plane passing through the center of curvature of the mirror. When the mirror, which is guided by movement of the lever A, turns in an angle α , the reflected ray turns in a double angle so that great sensitiveness is obtained.

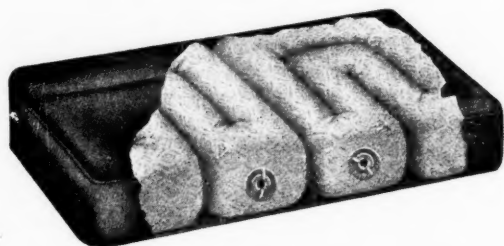
The value of the test weight may be varied according to the sample to be studied. The readings must be made when the image of the filament has become stationary, which in the case of small loads requires a few minutes, the deformation not attaining its final value immediately.

¹ By J. Audy in *Revue Générale du Caoutchouc*, Feb.-Mar., 1931, pp. 3-11.

Rubber Upholstery¹

Striking Progress in Recent Years

NOT so long ago a writer to the press inquired why rubber, in view of its obvious advantages, had not found a place in our houses in the form of cushions, chairs, and settees. It was also suggested that in spite of the proposal having won the major prize in the New Uses Competition,



Float-On-Air Cushion. Rubber Tubes Within an Outer Cover

initiated by the Rubber Growers' Association, no one seemed to have tried to put it into practical effect.

It is possible that this view might be somewhat prevalent. It would be as well, therefore, to record the real facts, which reveal an entirely different situation.

Upholstery offers such an enormous potential outlet for the employment of rubber that considerable research and development work has been carried out by firms and individuals with a view to evolving satisfactory types of rubber cushioning.

The translation of an idea into a commercial reality is often, it must be conceded, a tardy process, but the progress which is being made in rubber upholstery justifies the belief that steady and consistent efforts have been made to meet the needs of the sustained publicity of the last few years.

The earliest form of rubber upholstery was the ordinary air bag cushion type with which we are all so familiar. In view of the progress which has been made this type might, perhaps, now be regarded as being somewhat obsolete and possessing a strictly limited field of application. In its day, however, it performed a distinctly useful service, and many a weary traveler or footsore soldier has had occasion to be grateful for the comfort which it has afforded. One of the disadvantages of this form of cushioning was its tendency to side roll, and recent researches have therefore been directed towards overcoming this defect. The problem may be said to have been overcome very satisfactorily by at least two different types of pneumatic cushions which are now finding increasing application.

The first consists of a tube or tubes specially arranged and constructed so that they lie in folds within an outer cover.

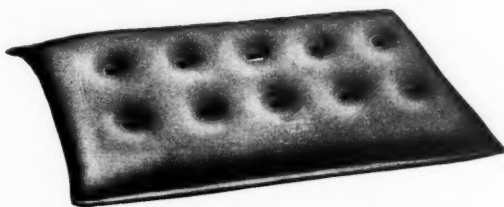
These folds run from front to back and provide a buoyant, comfortable seat. The weight carried is borne evenly by the tubes in that particular portion of the cushion, and complete support is given with surprisingly low interior air pressure.

The second type consists of a rubber bag filled with air and containing rubber pillars placed at intervals. These pillars, which are hollow, are open at each end and enable the cushion to keep its shape when a weight is placed upon it. It is entirely owing to these pillars that the rolling referred to in connection with the ordinary old-fashioned pneumatic cushion is overcome.

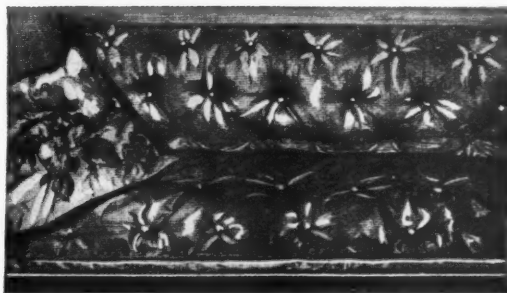
Side by side with this development of pneumatic upholstery, recent years have witnessed the adoption of sponge rubber for this purpose. The powerful resiliency of this material which reacts to every pressure makes it ideal for upholstery purposes and bids fair to revolutionize the manufacture of cushioning and bedding.

The major prize in the New Uses Competition organized by the Association and referred to early in this article, was in fact awarded to sponge rubber upholstery. As compared with pneumatic upholstery, cushions filled with sponge rubber are unpuncturable and do not require inflating. In home or office or in the car, they remain permanently soft and resilient and cannot possibly become hard or lumpy.

Much attention has been given to the best method of em-



Self-Controlled Air Cushion. Rubber Bag Filled with Air with Rubber Pillars at Intervals



"Newmatik" Sponge Stuffed Upholstery, a Mattress by Night and a Cushion by Day

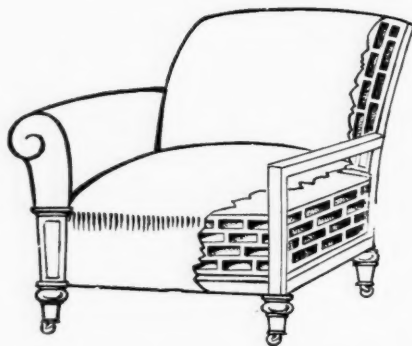
ploying sponge rubber for upholstery, but for the purpose of this article, three particular types which are now definitely on the market, will be noted.

The first is the employment of sponge rubber clippings which rely entirely upon the sponge rubber for resilience and has the advantage of being easily and cheaply manufactured. Alternatively, plain sheets of sponge rubber of requisite thickness have been utilized and have enjoyed a certain measure of popularity.

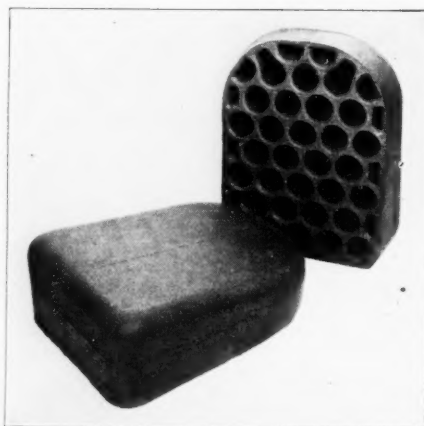
¹Bull. Rubber Growers' Assoc., Mar., 1931, pp. 125-30.

A later development, differing from the other types, involves the substitution of strips and sheets of sponge rubber for the usual springs and hair built up in tiers, as illustrated, to give the maximum of comfort and resiliency. A thin layer of wool or hair is added at the top or the bottom of the cushion, and the whole is enclosed in the usual tick or cover, which is provided with a number of air vents at the sides and ends. The result is a cushion which to all appearances is exactly similar to the ordinary spring and hair cushion and for which several important advantages over the latter type are claimed. Mattresses of sponge rubber are also being made in the same way and have been favorably commented upon by high medical authorities.

Recently there has been developed yet another form of sponge upholstery for which new and outstanding advantages are claimed. The sponge for this upholstery is made direct from latex. The essentials of the process for the production of latex sponge rubber are that a latex mixing is whipped into a froth, the froth poured into molds, allowed to set, vulcanized, and removed from the mold, and dried. The mixing used may be made either from concentrated compounded latex or concentrated latex obtained by centrifuging, the latter being preferable for low densities. The mixture is aerated by a patented procedure, and the resultant mobile froth is

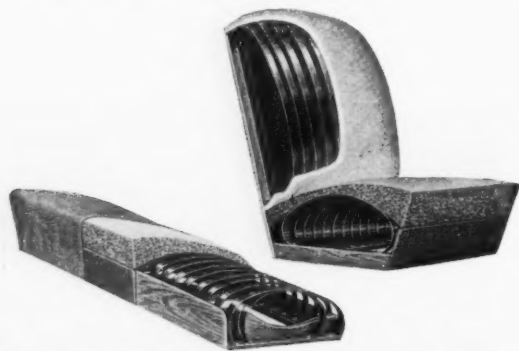


Sorbo Sponge Rubber Built Up in Tiers



Dunlop Rubber Co., Ltd.

The Latest Type of Sponge Rubber for Upholstery, Showing the Honey-Comb Method of Construction



Car Seats of Steel Slats Covered with Sponge Rubber

then poured into suitable molds, wherein owing to the addition of setting agent just before the end of frothing, it sets a few minutes after pouring.

The mold is put immediately into the vulcanizing pan and the vulcanizing carried out. The wet sponge rubber article then is stripped and finally dried. The setting of a mobile froth of the type described permits the easy molding of most complicated shapes in relatively inexpensive molds. Articles such as car seats, pillion seats, etc., which by the ordinary methods necessitate an expensive built up construction, may be molded in one piece as easily as a plain slab.

This molding in one piece permits the use of vertical cavities, which construction allows a minimum amount of rubber

to be used for a given load-carrying capacity. The provision of vertical cavities also ensures an enhanced comfort and cushioning effect.

A very important feature of this latex process is that articles can be easily made jointless but of graded properties. In upholstery the base or bottom portion can be constructed from a relatively dense sponge rubber, the upper or surface portion being of a light and soft sponge rubber. This is achieved by partially filling the mold with one froth, allowing it to set, and completing the filling with the second froth of a different nature. These froths unite inseparably at the interface.

In addition, sponge rubber articles of graded properties are not limited to different densities but may also be prepared from froths of different colors.

Further advantages and special features are also claimed for this latex sponge rubber. The use of ultra accelerators gives rise to a harder rubber which again permits a reduction in weight for the same load-carrying capacity. Latex sponge rubber has an abnormal liveliness and recovery owing to the fact that it has undergone no mastication or treatment that will impair its original nerve and to the use of accelerators normally prohibited. It gives the maximum degree of shock absorption and ensures a maximum comfort, due to its superior elastic properties and to the ability to obtain a fine pore

structure. There is an absence of crust in this type of rubber as no inflation takes place during cure, the structure being set before cure. There is only a superficial skin to the sponge rubber.

From what has already been said, it will be apparent that the criticisms referred to in the opening paragraph of this article can in no way be sustained; yet the progress which has already been noted by no means exhausts the keen interest and research which has thus resulted in the achievement of rubber upholstery of the first order.

Apart from complete rubber units, manufacturers interested in other forms of seating have investigated the possibility of combining rubber with other materials.

There has recently been developed an interesting type of car seat which represents a radical departure from the chief methods of



The Motor

Interlaced Rubber Base for Use with Air Cushion

construction (coil springs and pneumatic). The seat and the back squab are built up from specially tempered chromium steel spring slats shaped to find the right degree of comfort and resilience. An improved form of this seat is provided with a shaped layer of sponge rubber over the steel slats, as illustrated. This combination dispenses with all other stuffing material, is clean and hygienic, and will retain its shape for a number of years. Trimming is done away with, the sponge rubber being simply secured to the spring frame, nothing else being required but the final material in the form of a loose cover.

Considerable developments are also taking place in the production of a new form of seating with a rubber base which may give even more comfort and even greater shock-absorbing properties than the types already in use, particularly for car seats.

This rubber seating has been developed by the consultants of the Rubber Growers' Association, and it is proposed to use either a diaphragm consisting of a plain sheet of rubber stretched across a frame or interlaced strips of rubber as shown in the accompanying illustration. On the diaphragm there can be mounted either a padded type of cushion or one of the existing types of air bag, sponge rubber, or latex-treated hair. In any case it is claimed that the shock-absorbing qualities are greatly improved and comfort in-

creased as the diaphragm "gives" just sufficiently to absorb minor shocks and prevent any possibility of bottoming when the car traverses a bad road.

The rubber diaphragm, when loaded, assumes a hammock-like formation, and when used in conjunction with air bags, minimizes any lateral or fore and aft displacement or rolling.

Latex-treated hair, to which reference has been made, illustrates another important development in the utilization of rubber for upholstery purposes. This type is extremely buoyant, light and hygienic, and, unlike ordinary hair cushions, retains its resilience and does not become lumpy or sag.

Although, from what has already been said, it will be apparent that the progress of rubber upholstery during recent years has been considerable, it must not be presumed that the various types referred to represent all that has been done in this connection. Other investigations are also proceeding of which, for obvious reasons, it is not possible to say much at the present moment.

The buoyancy of rubber together with its durability and its hygienic properties are advantages which will compel attention, and the progress which has already been made in adapting this versatile material for upholstery purposes justifies the confident expectation that rubber cushions and mattresses will in the future provide a very valuable outlet for the consumption of rubber.

Latex Processed Rope

Method of Lubricating, Strengthening, Waterproofing, and Extending the Life of Rope

IN THE manufacture of rope and cordage the customary practice is to assemble the fibers in the form of yarns or slivers which are made into the rope and cordage by twisting or laying operations. In all instances when the rope or the cordage is designed for a large class of uses, a lubricating and preservative material is supplied to prolong the life of the fiber when the rope is subjected to heavy use as well as to preserve it against injury by fungoid or bacterial action.

Practice has demonstrated that with all material so far added to the fiber in the structure of a rope it is practically impossible to maintain effective waterproof conditions or to retain the lubricant at the center of the rope no matter whether the lubricant be an oil, graphite, or similar substance. This added material is quite effective when the rope is new, but when it works out and is lost, the rope begins to deteriorate. This difficulty is overcome in large measure by a new and special process¹, and qualities are imparted to rope and cordage hitherto believed unattainable.

Rubber Cemented Fibers

The invention consists in forming and laying up the rope by cementing and joining together the individual fibers, preferably, but not necessarily, in untwisted conditions or yarns. This joining together of the fibers is obtained by the use of a vulcanizable compound of commercial rubber latex. In this way no portion of the rope can be placed in a position where it must sustain a greater degree of chafing or wear than any other portion. In other words there is a larger area of wearing surface over which the wear will be distributed as compared with ordinary rope.

In addition to the latex impregnation, further protection is obtained by encasing the rope with a vulcanizable covering. While not necessary in all classes of ropes, such covering is highly beneficial in hoisting ropes so far as rubbing and chafing of the fibers is concerned. The material used for impregnating or binding the fibers is one of a large class

of vulcanizable compounds serving as an insoluble resilient body between the rope or cordage.

Typical Latex Compound

A preferred mixing is a latex compound comprising rubber latex, guayule, and crepe rubber dissolved in warm oil, but such natural or artificial resins or asphaltic compounds may also be used depending upon the lubricating qualities desired.

Rubber latex usually contains about 35 per cent of rubber and a small percentage of proteid and mineral matter stabilized by the addition of a small percentage of ammonia. In making up the compound there is added to the latex a desired percentage of cordage oil, sulphur, sulphides, polysulphides, and in some instances an accelerator for the vulcanizing process, and a metallic oxide to toughen the cured product.

Cordage oil commonly known in the trade as straw oil has a mineral base and is of light straw color. It will dissolve 4 per cent of sulphur, and by making a slight addition of ammonia and ammonium sulphide, additional sulphur may be dissolved in the compound and any additional percentage may be added by emulsification.

Highly Lubricated Compound

Inasmuch as the whole compound forms an emulsion which is stable for all practical purposes, it readily distributes itself completely among the fibers. If it is desired to have the rope highly lubricated, it should contain as high as 12 per cent cordage oil; $\frac{1}{2}$ per cent sulphur; 6 per cent rubber latex; .2 of 1 per cent zinc oxide; and .04 of 1 per cent of an accelerator such as hexamethylene tetramine. Less lubrication can be obtained by decreasing the cordage oil to any desired extent or some of the colloids mentioned, other than the rubber latex, may be utilized in the solution.

A rope thus lubricated, encased, and vulcanized, when used as a well cable, is not subject to so rapid disintegration because its fibers are bound together and held in place.

¹U. S. Patent No. 1,812,354, June 30, 1931.

Tire Table of

and the Cars That Use Them for 1931

		27	28	29	30	31			27	28	29	30	31			27	28	29	30	31
3.75-18	Austin					x	5.00-21	(31x5.00-30x4.95)						5.50-18	(28x5.50)					x
4.00-18	Mathis					x		Essex	x						Willys					x
4.40-20	(28x4.40)							Nash	x						5.50-19	(29x5.50)				
	Erskine	x					5.25-18	(28x5.25)							Buick					x
4.40-21	(29x4.40)							Chrysler	x	x					Chandler		x	x		
	Chevrolet	x						Eldor	x	x					Dodge			x		
	Ford	x						Erskine		x					Eldor			x	x	
	Whippet	x						Gardner	x						Falcon-Knight		x			
	Star	x						Graham-Paige					x		Durant		x	x	x	
4.50-20	(29x4.50)							Jordan	x	x					Graham-Paige		x	x		
	Chevrolet			x				Marquette				x			Hupmobile		x	x		
4.50-21	(30x4.50)							Nash					x		Marmon		x	x	x	x
	Chevrolet		x					Oldsmobile		x	x	x	x		Moon		x	x	x	
	Ford		x	x				Reo Wolverine	x	x					Nash		x	x	x	
4.75-19	(29x4.75)						5.25-19	(29x5.25)							Oakland		x	x	x	
	Chevrolet				x	x		Auburn	x						Peerless		x	x	x	x
	Durant					x		DeSoto				x	x		Studebaker				x	
	Ford				x	x		Erskine				x			Willys-Knight		x	x	x	
	Plymouth				x	x		Graham-Paige		x		x			Willys					x
	Star		x			x		Chrysler					x		Windsor					x
	Whippet	x	x	x	x			Gardner		x					5.50-20	(30x5.50)				
4.75-20	(29x4.75)							Hupmobile				x			Auburn				x	
	Chrysler	x	x					Marmon	x	x					Buick		x	x		
	Erskine			x				Moon	x	x					Nash			x		
	Moon	x						Nash					x		Studebaker		x	x	x	
	Whippet	x						Peerless	x	x	x				6.00-17	(29x6.00)				
	Plymouth			x	x			Studebaker-Dict.					x		Auburn					x
	Pontiac	x	x				5.25-20	(30x5.25)							Graham-Paige					x
4.75-21	(30x4.75)							Eldor		x					6.00-18	(30x6.00)				
	Chandler	x						Flint	x						Auburn		x	x	x	x
	Star	x						Gardner	x						Chrysler		x	x	x	x
5.00-19	(29x5.00)							Hupmobile	x						Eldor		x			
	Chandler		x	x				Moon	x						Gardner		x	x	x	x
	Chrysler				x	x		Nash	x						Graham-Paige				x	
	DeSoto		x	x	x	x		Oakland	x						Jordan		x	x	x	x
	Dodge	x	x			x		Oldsmobile	x						Kissel		x	x	x	
	Durant		x	x	x	x		Paige	x						Reo			x	x	
	Eldor			x				Stewart	x	x					Reo Wolverine		x			
	Essex				x	x		Vellie	x	x					Viking				x	
	Falcon-Knight	x						Willys-Knight		x					Willys					x
	Graham-Paige	x	x				5.25-21	(31x5.25)							6.00-19	(31x6.00)				
	Nash				x	x		Buick	x	x					Auburn		x			
	Pontiac		x	x	x	x		Chandler	x						Dodge		x	x	x	
	Reesevelt			x	x			Dodge	x						DuPont Racing Mod.					x
	Star	x						Nash	x						Duesenberg			x		
	Willys-Knight	x			x			Paige	x						Eldor			x	x	
	Willys					x		Studebaker	x						Franklin			x		
5.00-20	(30x5.00-29x4.95)						5.50-17	(27x5.50)					x		Gardner		x	x	x	x
	Chandler		x	x				Auburn							Graham-Paige		x	x		
	Davis		x				5.50-18	(28x5.50)							Hudson		x	x		
	DuPont			x				Auburn		x	x	x			Hupmobile		x	x	x	x
	Essex	x	x	x				Chrysler		x	x	x	x		Kissel		x			
	Falcon-Knight	x						Dodge				x	x		Loocomobile		x	x		
	Moon	x						Graham-Paige				x	x		Marmon				x	
	Nash	x	x	x				Hudson				x	x		Moon			x		
	Oldsmobile	x						Jordan		x	x				Nash				x	
	Vellie	x						Nash				x			Peerless		x	x	x	
								Oakland				x	x		Ruxton				x	

THE above tabulations, compiled by the National Rubber Machinery Co., and the most complete of their kind, tell an interesting story of the efforts of automobile manufacturers, aided by tire experts, to provide balloon tires peculiarly adapted to the many types of cars produced within five years. Those unfamiliar with the problems involved may wonder why so many tire sizes should be necessary, and to some it may afford a text for a sermon on standardization and simplification.

Car-building and rubber engineers can readily explain why such an assortment of sizes has been tried out; while the table itself provides an answer to standardizing critics, showing a general drift toward fewer, more uniform, and more serviceable sizes. Thus for 1931 cars the range of tire sizes is barely 21. A few years ago it reached over 60.

The most favored tire sizes in 1931 are 4.75-19 used by Chevrolet, Durant, Ford, and Plymouth; 5.00-19 used by

Chrysler, De Soto, Dodge, Durant, Essex, Nash, Pontiac, and Willys; 5.25-18 used by Graham-Paige, Nash, and Oldsmobile; and 5.25-19 used by De Soto, Chrysler, Nash, and Studebaker (Dictator). Auburn appears as the only user of 5.50-17; 5.50-18 has as users Chrysler, Dodge, Graham-Paige, Hudson, Nash, Oakland, and Willys; while 5.50-19 is listed for Marmon, Peerless, and Willys.

Auburn and Graham-Paige use 6.00-17; Graham-Paige and Willys favor 6.00-18; DuPont (racer), Gardner, Hupmobile, Peerless, and Studebaker (Commander) 6.00-19; Auburn, Chrysler, and Reo (Flying Cloud-6) use 6.50-17; Graham-Paige, Reo (Flying Cloud-8), and Reo Royal use 6.50-18. A strong favorite is 6.50-19 used by Buick, DuPont, Franklin, Hupmobile, LaSalle, Marmon, Packard, Peerless, Pierce-Arrow, and Studebaker (President). DuPont and Stutz utilize 6.50-20.

Cord, Cadillac-8, Marmon, Pierce-Arrow, and Stutz use

of Balloon Tires

Them for 1927-1928-1929-1930-1931

	27	28	29	30	31
6.00-19 (31x6.00)					
Studebaker-Comm.					x
Black Hawk			x	x	
Willys-Knight	x	x	x	x	
6.00-20 (32x6.00)					
Cadillac		x			
Chandler	x	x	x		
Davis	x				
Diana	x	x			
Dodge	x				
Elcar	x				
Flint	x	x			
Franklin	x	x			
Gardner	x				
Jordan	x				
Locomobile	x	x			
McFarlan	x				
Moore					
Nash	x	x	x		
Paige	x				
Peerless	x	x			
Reo		x			
Rickenbacker	x				
Roamer	x	x			
Studebaker	x		x	x	
Vellie	x	x			
Willys-Knight	x	x			
Hupmobile	x				
LaSalle	x	x			
Packard	x	x	x		
Pierce-Arrow	x	x			
Stearns-Knight	x	x			
6.00-21 (33x6.00)					
Ediak	x	x			
Chandler	x				
Nash	x				
Peerless	x	x			
Pierce-Arrow	x				
Rickenbacker	x				
Roamer	x				
Studebaker	x				
6.00-23 (35x6.00-33x5.77)					
Packard	x				
6.50-17 (29x6.50)					
Auburn				x	
Chrysler				x	
Reo Flying Cloud 6				x	
6.50-18 (30x6.50-6.20)					
Auburn		x	x	x	
Gardner		x	x	x	
Graham-Paige					x
Hudson			x		
Kissel	x	x			
Reo Flying Cloud	x	x			
Reo Flying Cloud 8					x
Reo Master			x		
Reo Mate-Victoria					
Sedan		x			
6.50-18 (30x6.50-6.20)					
Reo Royal					x
Locomobile			x		
6.50-19 (31x6.50-6.20)					
Buick				x	x
Cadillac V-16				x	
DuPont					x
Franklin	x	x	x	x	x
Graham-Paige			x		
Hupmobile				x	x
Kissel	x	x			
LaSalle			x	x	x
Marmon				x	x
Moore		x	x		
Nash				x	x
Packard				x	x
Peerless			x	x	x
Pierce-Arrow				x	x
Studebaker-Pres.		x	x	x	x
Windsor			x	x	
6.50-20 (32x6.50-6.20)					
Auburn		x			
Buick			x	x	
Cadillac			x		
Case			x		
Diana			x		
DuPont		x	x	x	x
Elcar		x	x	x	
Flint		x	x		
Gardner		x			
Jordan		x	x		
LaSalle		x	x		
Packard				x	
Roamer		x	x		
Stutz		x	x	x	x
Vellie		x	x		
Willys-Knight		x	x		
6.50-21 (33x6.50-6.20)					
Henney		x	x		
McFarlan		x	x		
Peerless		x	x		
Sayers-Scofield		x	x		
7.00-18 (30x7.00)					
Auburn		x	x	x	
Cord				x	x
Cadillac 8					x
Chrysler		x	x	x	x
Chester Cab				x	
Elcar				x	
Jordan				x	
Kissel		x	x	x	x
Marmon					x
Paige		x			
Pierce-Arrow				x	x
Stutz				x	x
Yellow Cab				x	
7.00-19 (31x7.00)					
Cadillac V-16				x	
7.00-19 (31x7.00)					
Dusenber			x	x	x
Kissel		x			
Lincoln					x
Packard					x
7.00-20 (32x7.00)					
Cadillac		x	x	x	
Cunningham		x	x	x	x
DuPont					x
Dusenber		x			
Elcar		x			
Rolls Royce					x
Lincoln		x	x	x	x
Marmon		x	x		
Packard		x	x	x	
Rickenbacker		x			
Stearns-Knight		x	x	x	
Studebaker		x			
Stutz		x	x	x	
7.00-21 (33x7.00)					
Cadillac		x			
Cunningham		x	x		
Henney		x	x		
Lincoln		x			
Locomobile		x	x		
McFarlan		x	x		
Packard		x			
Pierce-Arrow		x	x		
Rolls Royce		x	x	x	
7.50-17 Chrysler-Imperial					x
7.50-18 Cadillac V-12 &					
V-16					x
7.50-19 Cadillac V-16					x
TIRES ON IMPORTED CARS					
33x5 Hispano-Suiza				x	x
7.00-21 (33x7.00)					
Bentley				x	x
Hispano-Suiza				x	x
Isotta Fraschini				x	x
Minerva				x	x
Rolls Royce				x	x
Lancia				x	x
7.00-20 (32x7.00)					
Mercedes-Benz				x	x
Isotta Fraschini				x	x
Rolls Royce				x	x
Minerva				x	x
Bentley				x	x
6.50-20 (32x6.50)					
Mercedes-Benz				x	x
Front-Renault				x	x
7.00-20 (32x7.00)					
Rear-Renault				x	x
* (Drop Center Rims)					

7.00-18; Dusenber and Lincoln are partial to 7.00-19; Chrysler (Imperial) uses 7.50-17; Cadillac V-12 and V-16, 7.50-18; and Cadillac V-16, 7.50-19.

Austin appears with the smallest tire, 3.75-18. The next larger is that of Mathis, 4.00-18.

Hispano-Suiza for 1931 has 7.00-21, which has been standard also for the past two years with Isotta-Fraschini and Lancia. As for the past two years, Mercedes-Benz uses 7.00-20, as does also Isotta-Fraschini, Rolls-Royce, Minerva, and Bentley. As for the past two years, Mercedes-Benz uses 6.50-20, as does also Renault on front; and Renault continues, as heretofore, to use 7.00-20 on rear.

A general trend toward larger sizes is noted in the tire evolution of the past half decade. The Erskine came out in 1927 with 4.40-20. It changed in 1928 to 5.25-18, in 1929 used 4.75-20, and in 1930 adopted 5.25-19. Chevrolet, after rolling around in 1927 with 4.40-21, changed in 1928 to

4.50-21, in 1929 took on 4.50-20, and for 1930 and 1931 standardized on 4.75-19.

Ford in 1927 used 4.40-21, changed in 1928 and 1929 to 4.50-21; and, like Chevrolet, equipped for 1930 and 1931 with 4.75-19. Chrysler made its bow in 1927 with 4.75-20, but during 1928, 1929, and 1930 tried out on various types of cars five sizes of tires, 5.00-19, 5.25-18, 5.25-19, 5.50-18, and 6.00-18. Its 1931 cars carry 6.50-17 and 7.00-18.

Dodge utilized 5.00-19, 5.25-21, 5.50-18, 6.00-19, and 6.00-20 in 1927; in 1928, 5.00-19, 5.50-18, 6.00-19; in 1929, 5.50-19; in 1930, 5.50-18; and in 1931 has 5.00-19 and 5.50-18.

Studebaker in 1927 used 5.25-21, 5.50-19, 5.50-20, 6.00-20, 6.00-21, 7.00-20; in 1928, 6.50-19; in 1929, 5.50-19, 5.50-20, 6.00-20, 6.50-19; in 1930, 5.50-19, 6.00-20, 6.50-19; while in 1931 it utilizes 5.25-19, 5.25-21, 6.00-19, and 6.50-19.

EDITORIALS

Effect of Five-Cent Rubber

WHILE five-cent rubber is causing much concern to the large rubber companies, it is helping small and medium-sized manufacturers to get business that has been monopolized by the big fellows.

The reason is simple. In the past the big companies with large resources at their command have done considerable speculation in their raw products. A quantity of rubber bought and held on a rising market has netted them a tidy sum.

Although the market has been declining for the last two years, these companies continued their inventory speculations. Acting on the belief that 18 cents was absolutely the minimum cost of production, rubber was bought heavily when it dropped below this figure. "It can't go any lower," was the cry on each successive drop. But it did, and now it is known that rubber can be produced at a cost of 6 cents or less.

The small companies, which did not have large credits available, were unable to take advantage of "bargain prices." They could buy only enough rubber for immediate requirements. It is this fact, this ability to adjust themselves to a rapidly falling market, which has strengthened the position of small and medium-sized companies which are well managed.

With each drop in price these small and flexible companies are able to cut their final prices and can undersell the big companies in numbers of instances.

Of course if the price continues at the five-cent level for an extended period of time, new uses will be found for the product, and the large companies will be able to take advantage of the low prices too. Should prices recover, the strong financial resources of the large companies will again be brought into play.

But for the next few months, and in the event that prices go even lower, the well-managed small and medium-sized companies are going to have things their own way.

From the Planter's Standpoint

RUBBER has dropped to five cents on several occasions recently. The reason for the drop is the large stocks on hand; and the reason for the large stocks on hand is rubber's low price.

The heavy shipments that continue to harass traders are largely the result of native tapping. When rubber was selling at 20 cents or higher, the native grower could tap his trees when he needed money and then rest until his money was exhausted.

He is doing the same thing now, except that to get the same amount of money he must tap four times as much rubber at a price of five cents as he would if the price were

20 cents. So each drop in prices increases production.

On European-owned estates production is also being maintained at high levels. Orders have come from offices saying that production costs must be cut or the plantation closed down. To the white collar workers in the East a shutdown would mean the expense of a passage back home, with no prospects of a job when they arrived. The result is that these estates are continuing to produce rubber at costs that would have been thought impossible a few years ago.

Federal Aid for Tire Makers

UNWILLING to do as many in other lines have done, ignore the federal law prohibiting combinations for maintaining prices, leading American tire makers will, it is said, make an urgent appeal to Congress in December for such modification of the statute as will permit them to make a joint effort to put and keep prices on a fairly profitable basis. Since assurance will be given that no undue advantage will be sought over competitors, it is probable that a reasonable measure of relief will be granted. Truly, no industry stands in greater need of relief than the rubber industry, the earnings of which in late years have averaged less than 1 per cent on capital invested in manufacturing. In fact business has been largely "in the red," five companies making 70 per cent of American tires losing together in 1930 the sum of \$21,684,822.

Never were tire prices as low as now, nor has the motorist ever received such tire value. Some hold that tires are being made too good, and to the rapidly increasing durability of the product they trace a large part of the astounding losses in the industry. Others blame the poor showing on the continually diminishing sales prices, overproduction, and unfavorable bulk sales to automobile makers, chain, and mail order concerns; while some critics contend that all tire companies could make money for shareholders if but even four of the leaders got together and, ceasing rivalry for super-leadership, decreed a 25 per cent advance in prices. It is held that they would not need to worry about small companies as the latter would find it politic and profitable to fall into line.

In failing thus to get together, some believe, the leaders are but paving the way for a real Rubber Trust that will set prices at a new high level without any need to violate the federal law forbidding price fixing, which institution would probably make the going very hard for small tire companies and independent distributors. But the rubber men, loath to stretch the law, are confident that they will lose nothing by waiting but rather will gain much by biding their time until Congress convenes.

What the Rubber Chemists Are Doing

A. C. S. Rubber Division Meeting

THE Fall meeting of the American Chemical Society, Rubber Division, convened, with headquarters in Hotel Statler, Buffalo, N. Y., August 31 to September 4, 1931. The divisional program comprised twelve papers equally divided between the chemistry and the technology of rubber. The usual banquet was held and largely attended.

Abstracts of Papers

Oxidation Studies of Rubber, Gutta Percha, and Balata Hydrocarbons. The oxidation mechanism of rubber and gutta hydrocarbons has been studied. Rubber hydrocarbon in sheet form oxidizes slower and less completely than precipitated gutta, which is believed to be due to the smaller surface exposure of the former material. Gutta hydrocarbon in finely divided form oxidizes to a fairly definite degree in oxygen at room temperature corresponding to a weight increase of about 38 per cent. The length of the auto-catalytic induction periods for rubber and gutta varies over a wide range and is shortened by heating the hydrocarbon in high vacuum before oxidation and by exposure to light.

The rate of oxidation of gutta in air, as compared with oxygen, is reduced in proportion to the oxygen concentration, and the induction period is correspondingly increased. Carbon dioxide, water, formic acid, and formaldehyde were identified in the volatile oxidation products and their relative amounts determined. Six to eight per cent of the hydrocarbons are converted to volatile oxidation products. The percentage of unsaturation of both rubber and gutta hydrocarbons is reduced in proportion to oxygen absorbed. The ratio of hydrogen to carbon decreases as a result of oxidation.

The solid oxidized products are of such a nature that they could not be resolved into crystalline materials. They are amorphous, acid substances, free from aldehyde and ketone groups. They contain a small amount of peroxides, and the acidity, saponification value, and other properties indicate that most of the oxygen is combined in the form of hydroxyl, carboxyl, and lactonic groups. The mechanism of oxidation of rubber and gutta appears to be the same, and a possibility of a chain mechanism to explain the facts is discussed. A. R. Kemp, W. S. Bishop and P. A. Lasselle.

Mastication of Rubber—an Oxidation Process. Some of the changes which occur in rubber during mastication have been studied in an attempt to determine whether the breaking down of rubber

by milling is a mechanical or a chemical process. In using the photographic plate test peroxides were detected in smoked sheets, both after milling and after exposure to light in the presence of oxygen, and the concentration was higher when the rubber was milled on cool rolls than it was when milled on hot rolls. Pale crepe did not give so strong a test for peroxides; while the peroxides could not be detected at all in fine para and sprayed latex. These rubbers contain some material which can decompose hydrogen peroxide.

The softening of rubber on the mill is probably due to the breaking up of the long rubber molecules into shorter ones by an oxidation process. Oxidation occurs quite rapidly on the mill, because the rubber molecules are activated by mechanical distortion and the oxygen is activated by electrical charges. The stresses in the rubber and the electrical charges are both greater when milling is done on cool rolls than when done on hot rolls, which accounts for the greater effectiveness of cold milling.

This theory was verified by the peroxide experiments, by milling peroxides into rubber, and by the luminescence effects which were observed during milling. As a final check on the theory, rubber was milled in the presence of various gases. It was found that little, if any, breakdown of the rubber occurs if the milling is done in the absence of oxygen. W. F. Busse.

Temperature Coefficient of Vulcanization. Because of the low heat conductivity of rubber compounds the temperature of the inside of a rubber article during vulcanization is much lower than the outside. Since the curing intensity depends upon the temperature, the cure of the inside of the article is often widely different from that of the outside. In order to evaluate the cure it is necessary to know accurately how curing intensity varies with temperature. Satisfactory data for mercaptobenzothiazole stocks have been lacking.

The temperature coefficients have been determined for mercaptobenzothiazole mixes and for a mix accelerated by a croton aldehyde-aniline condensation product. Special care was taken to eliminate errors in temperature regulation, etc., by the use of thermocouples in the samples during cure. The values obtained were:

From	Modulus Data	Combined S
Mercaptobenzothiazole	1.91	2.30
Croton aldehyde-aniline	2.32	2.67

C. R. Park and R. B. Maxwell.

Behavior of Rubber Under Repeated Stress. This paper describes a simple and convenient apparatus for obtaining a graphical record of the tensile properties of rubber under a variety of conditions of stressing. Data are given showing the effect of repeated stretching and the speed of stretching on the stress-strain properties of typical rubber compounds. The recovery of rubber from strain is considered, and it is observed that complete recovery does not take place. Conclusions are drawn regarding the practical use of stress-strain curves in evaluating rubber compounds. The present paper does not consider the retraction cycle of the stress-strain curve nor the energy relations involved. No theoretical explanation is offered at this time for phenomena described. W. L. Holt.

Effect of Various Accelerators and Antioxidants on the Electrical Characteristics and Water Absorption of Vulcanized Rubber Insulation. Typical "30 per cent" vulcanized rubber insulating compounds have been prepared in which were incorporated separately 12 well-known accelerators and 12 commercial antioxidants. The moisture absorption, specific resistivity, specific A.C. conductance, dielectric constant, and power factor for each have been determined both in the dry condition and after immersion in distilled water at 70° C. for five days.

The data obtained indicate that the choice of accelerator or antioxidant among those tested is not critical as regards moisture absorption, but may be somewhat critical as regards electrical characteristics imparted to a high-grade soft rubber insulation. The variations in moisture-absorbing characteristics of the compounds, which are attributed to the particular accelerator or antioxidant used, are not satisfactory criteria for judging degree of electrical stability. It has been shown that power factor increases with time of cure in compounds containing thiurams as accelerators and 1.35 per cent of sulphur.

Of the accelerators tested highest resistivity values were obtained on compounds accelerated with thiurams. The variations in the electrical characteristics of the compounds containing antioxidants cannot be attributed directly to differences in chemical structure of the antioxidants. J. H. Ingmanson, C. W. Scharf, and R. L. Taylor.

Scorch Retarders and Scorch Retarding Materials. The effect of several softeners upon retardation of scorch is shown. This effect is also obtained by

using small amounts of some organic materials which might be classified as scorch retarders. The effect of some of these materials upon the temperature coefficient of scorch is found to be of different value at different temperature increments below that of the curing temperature, and it seems that the temperature coefficient of scorching decreases as the temperature is raised. H. R. Thies.

Measurement of the Average Particle Size of Fine Pigments. A method of obtaining excellently dispersed suspensions of rubber pigments of accurate concentration is described, in which the pigment is milled into rubber and the stock then dissolved in a solvent.

Measurements of the average particle sizes for a series of carbon black and of zinc oxide pigments were made, using the Zsigmondy count method. The average particle sizes of the carbon blacks ranged from .045 μ for rubber gas black to 2.22 μ for the coarsest one measured. The zinc oxide pigments had average particle sizes from .056 μ to .409 μ . Because of the high resolving power of the ultramicroscopes this method gives smaller values for the average particle size than are secured by photomicrographic methods. The depth of the counting cell was measured by means of a sensitive optical lever, which is described.

The results of the particle size measurements have been used to calibrate a microturbidimeter for use in measuring average particle size. Some equations are given to explain the action of the microturbidimeter, which is of the extinction type. Curves are included, showing how the turbidity of suspensions of zinc oxide and carbon black vary with the average particle size, concentration, and wave length of light used. S. D. Gehman and T. C. Morris.

Study of Flexing. Failure of flexing has been shown to be due to oxidation rather than mechanical fatigue or the action of ozone. Secondary aromatic amines protect by virtue of their antioxidant properties. Arthur M. Neal.

Reactions During Vulcanization. I. The Influence of Zinc and Lead on the Rate of Cure of Stocks Accelerated with Tetramethyl Thiuram Monosulphide. The acceleration of the vulcanization of rubber by thiurams at low temperatures is reduced by the addition of free PhO and water-soluble lead salts but not by insoluble lead salts. The retardation is due to the removal of part of the accelerator by the lead, and the amount removed is related to the amount of lead present. An equilibrium apparently exists between the amounts of zinc oxide and lead oxide and the accelerator, which is ordinarily on the side of a very large amount of the lead compound.

When an excess of the thiuram is present, a white product can be obtained even when litharge is present in the stock, which indicates further that the lead combines with the accelerator to form an insoluble material that is inactive at low temperatures. The increasing activity of the lead compound with increasing temperatures can be explained by increasing solubility in

rubber. The insolubility of the lead compound is further indicated by the fact that if the thiuram is added to a stock containing soluble lead, it is less effective than if it had been added after the lead so that the particles of accelerator would have had time to disperse in the rubber, rather than be coated by the insoluble lead compound.

Since large amounts of accelerator are required to obtain the same state of cure when lead is present, considerable hydrogen sulphide is required to convert the thiuram to the dithiocarbamate and, accordingly, the initial set-up cure is delayed. A considerable delay in set-up can be obtained also by increasing the amount of fatty acid and, therefore, the amount of soluble zinc, which will remove the hydrogen sulphide as fast as it is formed. H. C. Jones and Harlan A. Depew.

X-Ray Evidence That Rubber Is a Two-Phase System. It has been known for some time that unstretched rubber acts like an amorphous material towards a beam of X-rays, but that when rubber is stretched sufficiently, it diffracts X-rays like a fibrous material. Hauser has explained this action (*Ind. Eng. Chem.*, 21, 249-251, 1929) in terms of the unwinding of spiral molecules. Such an explanation does not necessarily require that rubber be a two-phase system.

By means of apparatus described in another paper a strip of rubber, vulcanized only enough to enable it to stand the necessary stretching, was made to undergo a continuously repeated cycle of stretching and relaxation, and an X-ray beam was caused to pass through the rubber for a predetermined length of time at some predetermined time in each cycle. It was found that the fiber structure is not produced simultaneously with the act of stretching, but that it requires a time interval in which to build up.

This time interval may be accounted for at once if we assume a two-phase system (true gel) for rubber in which Hauser's coiled molecules represent beta rubber and in which the liquid is alpha rubber situated in the voids left by the coils. Such a picture would require that the alpha phase must be squeezed out to the interfiber spaces before the molecules of the stretched beta rubber can align themselves into true fibers. The difficulties involved in any effort to explain this time-lag on the basis of beta rubber alone make a single-phase structure (pseudo gel) seem highly improbable. M. F. Acken and Wheeler P. Davey.

Compression Stress-Strain of Rubber. The compression characteristics of rubber are studied through two-dimensional stretching, thus avoiding the difficulties of direct compression. The equivalent compressive force is computed from the tensile forces actually used to stretch the rubber in two directions. Uniform strain and stress during two-dimensional stretching are attained by having the specimen in the form of a hollow sphere and inflating with air. The experimental quantities measured on the sphere are: original wall thick-

ness and, at intervals during inflation, gas pressure, radius, and the length of a bench mark. From these readings the corresponding values of compressive force and per cent compression are obtained. The method is hypothesized on the change in volume as the rubber is deformed being negligible.

Typical results on a cold-cured, pure-gum balloon stock are cited, such as breaking point of the compression curve, energy of compression, and hysteresis.

Data for compression and extension support the view that the stress-strain curves for these two operations are continuous and that the "complete" stress-strain curve consists, therefore, of a positive (elongation) branch and a negative (compression) branch. Based on such continuity being a fact, the main analytical features of the "complete" stress-strain curve for rubber are pointed out. J. R. Sheppard and W. J. Clapson.

Effect of Oxide of Iron Containing Soluble Ferric Sulphate on Rubber. The traces of free ferric sulphate present in oxide of iron are shown by experiment to cause accelerated aging of rubber. This impurity markedly retards the rate of cure. Oxide of iron treated with Na_2CO_3 in solution to change the soluble ferric sulphate to insoluble ferric carbonate shows good aging properties and a high rate of cure. Aggregates of oxide of iron caused by $\text{Fe}_2(\text{SO}_4)_3$ during its manufacture increase in frequency and size, and the color value of the pigment decreases as the percentage of retained ferric salt increases. Joseph W. Ayers.

Los Angeles Group

The Los Angeles Group of the Rubber Division, A. C. S., held a Blind Bogey golf tournament at the Montebello Country Club, August 1. Twenty-eight took part in the game and the dinner and social evening which followed.

A. L. Pickard, of the Braun Corp., won the low net with a score of 81, for which he received a dozen golf balls donated by his company. Howard Lundberg, of the Kirkhill Rubber Co., won the first blind bogey with a net of 82, for which he got a dozen golf balls given by the Pacific R. & H. Chemical Co. T. Sheldon Dahl, of the C. P. Hall Chemical Co., won the second blind bogey with a net of 75; his prize was a dozen golf balls presented by the Hall company.

This first venture in outdoor social activity by the L. A. Group having proved so enjoyable, plans are being made for another tournament some time in October.

Visit of British Chemists

The Council of the Institution of the Rubber Industry has accepted the invitation extended by the Rubber Division of the American Chemical Society to attend its autumn meeting on September 5, 1932. The council through the Papers Committee has appointed, in this connection, a sub-committee of arrangements consisting of S. S. Pickles, D. F. Twiss, B. D. Porritt, and P. Schidrowitz. W. F. V. Cox, Faraday House, 10 Charing Cross Road, London, W. C. 2, is secretary of the I. R. I.

Paris Rubber Conference

THE International Rubber Conference was held at Paris, June 10 to 13, 1931. The following selected abstracts are representative of the many interesting and important papers read at the sessions.

Abstracts of Papers

Minimum Quantity of Sulphur Required for Vulcanization. In attempting to answer the question as to what is the minimum amount of sulphur required for vulcanization, the problem is to determine when it is correct to say that a rubber is cured and when it is to be regarded as not yet cured. Numerous experiments were conducted to answer this question; and it was found that when mixings with increasing amounts of sulphur are otherwise similarly treated, the curve representing the mechanical properties as function of the sulphur content show a noticeable break, indicating the beginning of vulcanization, when the sulphur content is 0.15 per cent calculated on the rubber. This amount, therefore, is to be considered as the minimum needed for vulcanization. G. Bruni.

Autoxidation of Rubber and Catalytic Phenomena Connected Therewith. To comprehend fully the complex question of the aging of rubber, the various problems connected therewith must be solved one after another; consequently the present study is confined to the question of autoxidation, that is the rate of absorption of oxygen by rubber, and the various influences which modify it.

The method pursued is that worked out by Dufraisse, Moureu, and their collaborators in their general studies of autoxidation. It consists, in principle, of enclosing the material to be tested in a small glass receptacle with oxygen. Contrary to usual practice only small quantities of oxygen have been used; generally less than 1 per cent; the purpose is to deal only with the commencement of oxidation. The authors have found that the absorption of 4/1000 of oxygen, or 0.008 mol. per molecule of isoprene by crude rubber and of 6/1000 of oxygen, or 0.012 mol. per molecule of isoprene, by vulcanized rubber, is sufficient to produce signs of deterioration.

The oxygen is used at a pressure not exceeding 760 mm., and catalyzers are introduced into the rubber samples by diffusion. First latex pale crepe only was used. The tests covered the influence of the acetone extracts on the autoxidation of crude and vulcanized rubber, the effect of accelerators apart from their action on vulcanization, the effect of the catalyzers of autoxidation.

The effect of the catalyzers was found to depend not only on various physical conditions but also to vary with the substances with which they are used. Thus whereas acetylacetonate of copper has a powerful antioxygen effect on limonene, it is an active prooxygen with regard to rubber with which limonene is chemically related. This series of

tests, demonstrating the value of the Dufraisse-Moureu method in studying autoxidation, shows a satisfactory parallelism between autoxidation and the findings for natural aging as obtained by the usual methods.

Dufraisse concludes that while great progress has already been made in the study of autoxidation, much still remains to be done so that rubber may eventually become truly stabilized and, consequently, find vast new fields of application. Charles Dufraisse and Nicholas Drisch.

Latex Concentrates and Mixings. Of the possible methods of obtaining latex concentrates—filtration, evaporation, and removing the cream—the first has so far found no technical application while the cream removing process has the disadvantage of requiring the addition of foreign substances. Great progress has been made in the evaporating methods, particularly Revertex; but Twiss considers the centrifugal (Jatex) process, after Utermark, as employed by the Dunlop company, the best since it gives a product free of non-rubber constituents, the presence of which offers difficulties during manufacturing. By centrifugation the latex is separated into a creamy layer containing 61.5 per cent of dry substance, 60 per cent coagulable rubber, and a thin residue containing 11 per cent dry substance with 7.1 per cent coagulable rubber.

Twiss groups the mixings into those compounded of concentrated latex and fillers and those obtained by evaporating a mixture of non-concentrated latex and fillers. The Dunlop company has in operation its own specially constructed evaporating apparatus for the latter purpose. This company uses latex for dipped goods, sponge rubber, waterproof fabrics, impregnating cord, etc. D. F. Twiss.

Action of Nitric Oxide on Rubber. In these tests "Total" rubber obtained from Revertex was dissolved in tetra chloride of carbon to a 1 per cent solution. The solution was added at 0° to 5 parts of a solution of N_2O_4 in tetra chloride of carbon saturated at room temperature, then left standing for a period of 15 minutes and then again for 24 hours.

The results showed clearly that the chemically purest NO_2 gives no homogeneous reaction products with rubber. If the product obtained after 24 hours' treatment is heated with concentrated alkali, about a third of the nitrogen content separates as ammonia. The NO_2 has a powerful oxidizing effect.

When NO was used instead of NO_2 , a product corresponding to $C_{18}H_{16}N_2O_{10}$ was obtained, which, like the product with NO_2 , was not homogeneous and reacted in the same way to treatment with alkali.

Finally rubber was treated with dilute nitrous acid and gave a product containing N that was partly insoluble in acetone. Adolf Gorgas.

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EFFECT OF MATURATION ON THE PLASTICITY OF SMOKED SHEET. G. Martin and L. E. Elliott, *Trop. Agri.*, June, 1931, pp. 345-49. Tables.

ACCELERATORS OF VULCANIZATION. F. Jacobs, *Caoutchouc & Gutta-percha*, July 15, 1931, pp. 15602-07. (To be continued).

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EXPERIMENTS ON AUTOXIDATION OF RUBBER AND THE PHENOMENA OF CATALYSIS CONNECTED THEREWITH. C. Dufraisse and N. Drisch, *Rev. gén. caoutchouc*, May-June, 1931, pp. 9-24. Graphs.

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Technical Communications

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Technogram No. 2

MOST uniform blending of various grades of crude rubber with each other, and of crude rubber with reclaim is obtained if the following procedure is used. The hard and the soft materials are placed on opposite ends of the front mill roll, and the materials sheeted at their respective ends, avoiding as far as possible mixing of the two materials. After both materials are sheeting fairly smoothly, the soft material is gradually cut across the mill roll and blended into the harder material. This procedure is continued until a fairly uniform blend of the two materials is obtained. Then the batch is cross cut in the usual manner. Data from R. R. Olin Laboratories, Akron, O.

Vulcanizing Tire Repairs

THE temperature at which a tire repair is vulcanized should not greatly exceed the temperature applied to the tire when it was built. Tires are "cured" at comparatively low temperatures, and therefore, in curing a tire repair the temperature should be kept as low as possible, consistent with proper strength in the repair. Both under and over cures are to be avoided.

A new tire is built of cords imbedded in rubber commonly known as cushion stock. This stock classifies as a "quick cure" or easily vulcanized material. It will not stand a severe application of heat nor long exposure to the elements. It is a compound which will allow the cords in the tire to flex without injury.

Tread stock, unlike cushion stock, requires the application of more heat to vulcanize it. This is compounded to resist wear and the action of the elements.

The application of a given amount of heat might vulcanize the cushion stock in a tire in 15 minutes. It would probably require an hour to vulcanize the tread rubber; therefore the greatest amount of heat should be applied to a tire repair from the outside. Any method of vulcanizing a tire repair which applies the greatest amount of heat to the inside of the tire will overcure the cushion gum and yet fail to vulcanize the tread stock.

The exception is the case of heavy truck tires where, because of the thickness of the tread section, it is desirable to apply a small amount of heat to the inside of the tire as well as to the outside. This feat is accomplished by use of the steam bag, and with this method the temperature on the inside of the repair does not ordinarily exceed 260° F. or the equivalent of 20 pounds saturated steam, and is ample to effect thorough vulcanizing of the repair. Although 60 pounds of steam pressure at

307° F. is used inside the steam bag, the actual temperature on the surface of the bag in contact with the tire does not greatly exceed 260° F., because of the slow penetration of the heat through the wall of the bag.

A tire dealer can make no greater mistake in the conduct of his tire repair department than to vulcanize tire repairs without studying the effect of different applications of heat to the repair. The poorest kind of reinforcement of a repair will have some chance to deliver mileage if it is properly vulcanized into the tire. The best type of reinforcement will fail if it is not properly vulcanized. Data from *The Goodyear News*.

Latex Compounding¹

THE compounding of concentrated latex must be performed with due regard to the special properties of colloidal substances. The technique, therefore, differs considerably from that of raw rubber compounding. The compounding ingredients are added either by dry sifting into the slightly diluted concentrates or after thorough wetting, into a paste with water. The volumes of water required per kilo of material to wet out some of the commoner materials for latex compounding is shown in the following table:

Water Required to Wet Ingredients for Latex Compounding		C.C. of Water
Litharge	150	
Barytes	200	
Lithopone	300	
Clay	500	
Zinc Oxide	600	
Vegetable black	750	
Carbon black	2,350	
Kieselguhr	3,500	

Hard waters must not be used since the calcium and magnesium salts present have a marked coagulating effect on latex. On this account, also, materials such as lime and magnesia should not be used. When higher percentages of filler are required, it is necessary to make use of protective colloids to prevent coagulation; such stabilizers include potassium and ammonium oleates, casein in ammonia or borax solution, glue, turkey red oil, saponin, and Saprotin A. Softeners are added as emulsions: namely, waxes and oils, although it has been found that the protective colloids present in Revertex are sufficient to effect dispersion of many oils by stirring alone.

Substitutes prepared by dispersing the solid material of vulcanizing previously dispersed in oil are used, as are dispersions of crude, vulcanized, or reclaimed rubber. Water soluble accelerators can only be used if the latex is to be dried on non-porous material. In other cases water insoluble accelerators should be used.

Coloring is best effected by organic pigments in paste form. Certain lakes tend to bleed off their bases; while badly dispersed colors of any kind will be removable by rubbing the cured article with a damp rag. Colors which are unstable toward alkali, such as antimony sulphides, should not be used if the articles prepared from the latex have to be dried by heat. Colors unstable to acid, ultramarine for example, must be used with care if an acid coagulation process is contemplated. A further method of introducing color is by the addition of dispersions and emulsions of oil soluble colors. Their mixing is carried out in a single plant and requires very little power.

¹"The Uses of Concentrated Latex," by J. H. Carrington.

R 2 Accelerator

THE active principle in the ultra-accelerator R 2 is the same piperidine derivative as that in Pipsol X blended to constant curing strength by admixture with a neutral agent. R 2 is soluble in naphtha, benzol, etc. It can be used for vulcanizing thin goods by dipping them into a solution of the accelerator in naphtha. It is necessary to have the proper amount of zinc oxide and sulphur milled into the rubber. R 2 can also be milled directly into rubber. When used, however, in that manner, either the sulphur or R 2 should be omitted until just previous to the vulcanization because uncured R 2 stocks containing zinc oxide and sulphur air cure very readily.

For transparent goods the use of R 2 accelerator is recommended, and the following formula is given:

Pale crepe	100
Zinc oxide	0.50
Sulphur	1.00
R 2	0.75

Press cure 30 minutes at 10 lb. steam or 12 minutes at 20 lb. steam. Data from The Rubber Service Laboratories Co., Akron, O.

Compounding Ingredient

THE physical properties of rubber compounds may be substantially improved with respect to durability, elongation, and tensile strength by the addition to the mixing suitable proportions of mineral oil naphthenic compounds as in the following example, in parts by weight; roll brown crepe, 100; sulphur, 6; zinc oxide, 5; accelerator, 1; oil soluble naphthenic acid, 2, accompanied by an approximately equivalent amount of mineral oil.

This mixing vulcanized from 30 to 90 minutes at 290° F. shows very markedly improved properties over a similar compound containing no naphthenic acid. Data from U. S. Patent No. 1,815,778, July 21, 1931.

New Machines and Appliances

Super-Production Tuber

SEVERAL interesting and valuable features are embodied in the super-production tuber and strainer represented in the illustration, distinctive among which are the elimination of massive structure, the combination in the machine of straining and insulating means, and the attainment of greatly increased output.

In addition to the usual stock worm with its heat producing slippage and resulting inefficiency, a practical means for building up exceedingly high delivery pressures is introduced to relieve the stock worm of all frictional drag save that required to deliver the compound through a large aperture in the intake side of a pressure boosting element. The pressure and delivery volume are amply high to permit the introduction of the straining operation between the pressure boosting element and the extruding dies.

Referring to the illustration, the insulating composition is fed into the machine as usual through the hopper opening A and advanced by the stock screw to the pressure boosting element B, which is encased in a jacketed housing C. The stock is forced by the booster through the temperature controlled, quick changing strainer magazine D and onward through the insulating die section E.

The pressure booster element B consists of a pair of gears, the revolutions of which serve to seize successive portions of the stock delivered by the feed screw through a large opening and force them with rapidly increasing pressure against the strainer. The rapid impelling action of the booster eliminates burning of the compound, and the high pressure positive movement of the material makes possible the combining with high efficiency the operations of straining and extrusion.

In the wire insulation industry this machine produces uniformity of diameter of extruded wire at uniform covering speed limited only by panning or reeling efficiency. Thin walls on small wires, impossible on a worm propelled extruder, can

be produced by this machine at exceedingly high speeds. Delivery of insulation will vary from 20,000 to 50,000 feet per hour according to the size of the wire.

Perfectly clean insulation is insured by sealed delivery of strained compound to the wire. This feature is of exceeding value in water tested wire. Soft compounds practically impossible to extrude economically with worm feed alone can be extruded with this machine at high speed. Corone Wire Insulators, Inc., Putnam, Conn.

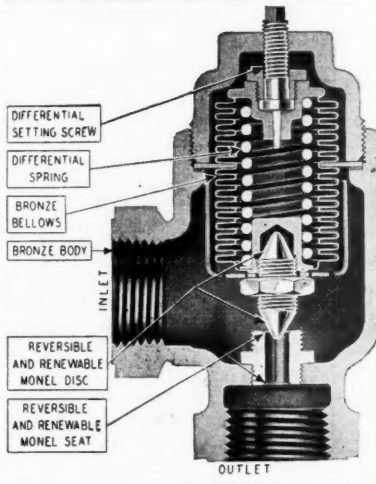
Unique Steam Trap

THE new and exclusive differential setting feature makes it possible for this steam trap to discharge condensate at a temperature corresponding to a uniform differential pressure from 0 to 20 pounds

20 pounds less than the operating steam pressure, it will discharge the condensate at this differential regardless of whether the steam pressure is 50, 75, or 125 pounds and without any further adjustment of the differential setting.

When the differential setting screw is all the way up on the trap, no tension is on the spring, and the trap will discharge condensate from 1 to 2° below the temperature of the operating steam. When tension on the spring is applied, by simply turning down the setting screw, a mechanical pressure is created on the inside of the bronze bellows which aid the vapor pressure developed in the bellows to close the valve. Thus the amount of mechanical pressure exerted by the spring determines whether the trap will close at the temperature of the operating steam or 5, 15, or 25° below this temperature, and, in reverse effect, whether it will open to discharge condensate at 1 to 2° below the operating temperature of the steam or at 7, 17, or 27° below that temperature.

The manufacturer has concentrated on the 1-inch size only, as the full $\frac{1}{8}$ -inch valve opening assures ample capacity and permits easy interchangeability on every steam line. Thus only one set of replacement parts is required for any application within the capacity of the trap. C. J. Tagliabue Mfg. Co., Park and Nostrand Aves., Brooklyn, N. Y.

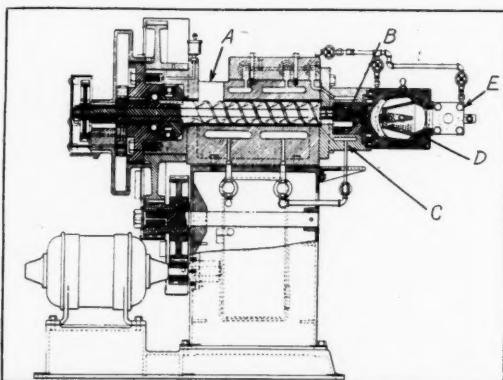


TAG Steam Trap

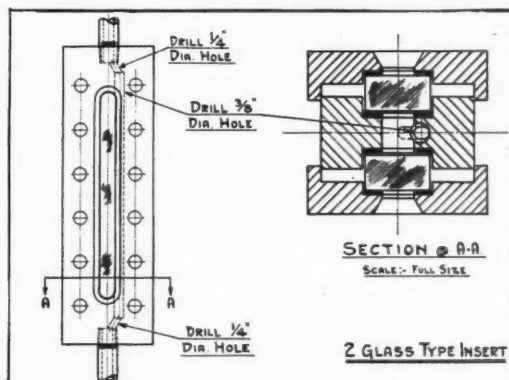
below the operating steam pressure. If the trap is set to discharge condensate at a temperature corresponding to as much as

Flat Glass Steel Gage Insert

ONE of the most important items of construction of the gage glass inserts pictured is the improved condensate guide. This consists of a channel of circular cross section, drilled through the insert body, parallel to and connected with the glass chamber. This channel or guide does not contain any vanes or loose pieces to obstruct the flow of condensate. The top and bottom gage connections discharge directly into the condensate guide, thus causing all of the condensate to run down the guide instead of down the glass. The condensate



Johnson Super Tubing and Straining Machine



Yarway Water Gage Steel Insert

guiding channel is connected to the glass or sight chamber by an ample, full area slot that permits instantaneous adjustment of the water level without permitting the condensate to flow out until it reaches the water level.

The clouding and erosion of glasses and mica in flat glass inserts is caused by the impinging and solvent action of the condensate. Mica is used to protect the glass from this attack, but mica of sufficient thickness to resist the continual wash of hot condensate cuts down the visibility or ease of reading the water level. Since the improved condensate guide eliminates this discharge against the glass, much thinner mica can be used, thereby allowing a greater amount of light to pass through the insert. This means the water level can be observed with greater clarity. Not only is visibility improved by the use of the condensate guide, but the life of the glass and mica protection faces is very much lengthened. This means that the period of time between cleanings is also materially lengthened. The Yarnall-Waring Co., Philadelphia, Pa.

Electric Heater Cord Tester

THE electric heater cord testing machine here pictured consists of a welded steel base A supporting a stationary frame B and an oscillating frame C. The drive consists of $\frac{1}{4}$ -hp. motor D which drives a speed reducer E through a round belt and grooved pulley. This speed reducer operates through compound leverage F, the oscillating frame C, at a speed of 18 to 20 times a minute.



New England Butt Heater Cord Tester

On the stationary frame B, is bolted an oak board G, which supports the electrical appliances consisting of a circuit breaker H, small no-load relay, two 7 amp. resistance units; also necessary clips and weights to complete the machine for cord testing.

When the oscillating frame, which moves to and fro, operates, it will stretch the cord to its full length and collapse from 18 to 20 times a minute. These figures are in accordance with the underwriters' specifications.

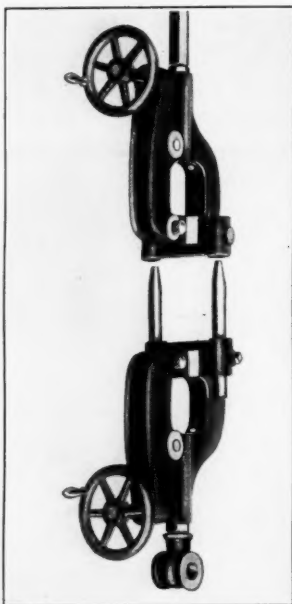
The circuit breaker operates in a direct

overload, and if any one of the cords under test short circuits, it will immediately open and stop the motor. If any of the cords under test open up or a wire breaks, the no-load relay directly on the right of the circuit breaker will open up and stop the motor.

The entire circuit, when connected, is loaded to a 7 amp. capacity through two heater units which are attached to the terminal board. Actual test of these heater units shows that they are almost exactly 7 amp. load, which is the load the underwriters specify must be imposed on the cord test. New England Butt Co., Providence, R. I.

Alinement Pin Jaw

AN IMPROVED form of jaw for use in vertical or upright testing machines is here pictured. Its special feature is a pair



Scott Alinement Jaws

of tapered guide pins fixed in the lower jaw, which are about $\frac{1}{2}$ -inch in diameter and project upward. They are adjustable for different spacing between the top and the bottom jaws. The upper end of the pins fit into tapered holes in the upper jaw when placing the test specimen but disengage when the jaws separate. In this way they regulate the distance between the jaws and hold them in positive alinement while the test specimen is being inserted.

This constitutes an important change in testing apparatus for textiles recommended recently by A. S. T. M. Committee D-13 as a tentative standard. Henry L. Scott Co., Providence, R. I.

Laboratory Table Top

A NEW feature of laboratory bench construction is the table top and lead trough here described. The working surface of the table top is an acid proof impregnated composition fabricated over a wood sub-base.

The material here used is molded by heavy hydraulic pressure under chemical and physical control. It has a uniform density, great compression, and cross-bending strength but still retains its resiliency and flexibility. This material, known as Shelstone, is highly resistant to concentrated acids, alkalis, organic solvents, and discoloration by dyes or colored salt solutions. It is tough, resists abrasion, and will neither crack nor break. When fabricated with a six-pound chemically pure antimony lead lined trough, the construction provides a very durable trouble-proof combination for the laboratory. E. H. Sheldon & Co., Muskegon, Mich.

Laboratory Scale

A LABORATORY scale of no spring type, designed to permit close reading without the use of extended beam equipment is here pictured. The scale chart has a capacity of 500 grams, with a mark and figure for each gram. It also shows the avoirdupois equivalents. Additional capacity up to 5 kg., may be secured by



Toledo Laboratory Scale

the use of weights. The scale is so designed that the oscillation ordinarily found in extended beam type scales is thus eliminated.

The chart housing may be set at any convenient angle, and the scale comes equipped with either a pan, platter, or scoop as the purchaser desires, according to the type of material to be weighed.

The scale is finished in grey baked enamel, which is easily kept free from any dust and dirt that may accumulate upon it during its use.

This scale is for use, primarily, in industrial research laboratories. It will be a great aid to research engineers as it enables them to weigh ingredients accurately, to the gram, in approximately one quarter the time consumed with balance equipment. Toledo Scale Co., Toledo, O.

New Goods and Specialties

Swimming Tube Has Concealed Rubber Valve

THE "World of Fun" swimming tube features a fool-proof valve without any metal parts, which permits the tube to be easily inflated or deflated at will.

After the tube is blown up, the stem of the rubber valve is rolled up and pushed through the valve hole, providing a positive seal and requiring no tying. To deflate, the valve may be pushed out easily by pressing the thumbs under the valve.

These swimming tubes come in three sizes: small, medium, and large. Their colors are solid blue, red, or green, mottled orange and green, and mottled red and blue. Essex Rubber Co., Trenton, N. J.

All-Rubber Sand Blast Helmet

FOR sand blast workers appears an all-rubber helmet boasting many distinctive features. This equipment, known as Pangborn Type DE Helmet, has a pure gum rubber exterior, seamless and of great resilience. A flexible rubber cape saddles the wearer's shoulders.

This helmet protects the operative's eyes, flesh, and lungs. It, furthermore, protects the buyer against replacement expense, for the helmet can be repaired as simply as patching a tire tube.

A curved window giving true vision, protected by a bulged screen, is another interesting feature. Both glass and screen are easily replaceable. Piped at any desired pressure into the back of the helmet fresh air is kept circulated for breathing, and a fixed jet above the soft, special sweat band cools the head. Through holes above it, air sprayed onto the outside of the visor keeps dust from fogging the visor window.

An additional advantage of this helmet is the Pangborn Type B Air Washer, which supplies the worker with clean water-washed air practically at atmospheric pressure.

This helmet is easy to put on or take off. A chrome leather tie string saves tying.



Pangborn Type DE New Head Protection

After the equipment is put on, the ring clutch on the tie string is moved along to a satisfactory tight point. Pangborn Corp., Hagerstown, Md.

Rubber for Mechanical Monsters

THE stage quite frequently calls for mammoth animals, which, were they real (and readily available), would most likely jeopardize life and limb of the players. Human ingenuity, in consequence, is called to supply realistic, but safe, jungle creatures. Thus the mechanical beast, in which rubber plays no small part, results. Two of the most recent of such monsters, created and built by Messmore & Damon, 404 W. 27th St., New York, N. Y., are here illustrated.

The Amphibious Dinosaur Brontosaurus, 50 feet long, used at the Roxy Theater, makes use of much rubber in various forms.



Criterion Photocraft Co.

Amphibious Dinosaur Brontosaurus

The exterior is a rubberized liquid, which is used before the final coating of paint is put on. Some of the joints, moreover, are worked with rubber hose. The teeth of the beast are of a rubber spongy substance so as not to scratch the body of the dancer who is caught up in the mouth of this prehistoric animal.

The five mechanical elephants that walk down the stage at the Ziegfeld's Follies have a coating of liquid rubber as a sizing before the paint is put on. This coating aids in giving the pachyderm a natural texture. The liquid rubber also helps to give the ears a natural sway. Rubber sheeting is employed to give breathing movements to the beasts.

Animal Cracker Toys

A DELIGHTFUL novelty that will charm the kiddies is the sponge rubber Animal Cracker Toys recently perfected by the Seiberling Latex Products Co., Akron, O. These beasts, of the size and shape of the crackers after which they are named, are made of live sponge rubber in several attractive colors. These toys, which will float in water and are safe, sanitary, and instructive, are wrapped in a glazed paper envelope which contains a dog, a cat, a horse, a cow, and a pig.

New Rajah Sole

NOW comes a rubber sole that is cool to the foot. Nor is that feature the only outstanding one of the New Rajah Sole developed by the Alfred Hale Rubber Co., North Quincy, Mass. This sole is well suited to street shoes because it is long wearing, nor does it spread or curl. Besides, it holds the stitches at the toe as well as at the sides. The material of which the sole is made prevents it from heating the foot, a characteristic common of ordinary rubber soles.

Experience has proved that this sole is very successfully worked on in the shoe factories, for it is easy to cut and takes a very fine edge.



Criterion Photocraft Co.

Mechanical Elephant

Editor's Book Table

NEW PUBLICATIONS

"Royle Tubing Machine Heads and Fixtures." John Royle & Sons, Paterson, N. J. This beautifully illustrated bulletin pictures in clearest detail heads and head fixtures of the 8-bolt series built for the Royle Super-Perfecting tubing machines. These parts are all made of steel in sturdy and symmetrical construction. Royle bulletins are uniform in size and punched for looseleaf binding.

"Handbook for the Use of Conveyor and Bucket Elevator Belts." The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. This pocket-size indexed booklet of 38 pages contains much important information for engineers and operators of belt conveyor and elevating systems. In brief compass data is given on construction and uses for these types of belting including comprehensive data sheets covering conditions for their use.

"Universal Vibrating Screens Catalog No. 90." Universal Vibrating Screen Co., Racine, Wis. The construction and operating principle of this series of vibrating screens are clearly illustrated and described. The claim is made that these screens will handle all bulk materials, such as compounding ingredients, with the highest degree of efficiency yet attained in screening equipment.

"A Memorandum on 'Hakuenka,' the White Reinforcing Agent for Rubber Compounds." Shiraishi Kogyo Kaisha, Ltd., Tokyo and Osaka, Japan. This pamphlet of 26 pages is descriptive of the several grades of "Hakuenka," which is described as an isomer of calcium carbonate qualifying as a new colloidal compounding ingredient with reinforcing effect in rubber compositions rivaling carbon black.

"The du Pont Magazine." E. I. du Pont de Nemours & Co., Wilmington, Del. The July-August, 1931, issue of this magazine contains an interesting article giving historical notes on The Grasselli Chemical Co., which was united in 1928 with the du Pont company. A striking parallelism is shown in the founding and the development of these two companies now consolidated better to serve the needs of agriculture, mining, rubber, and manufacturing industries.

"Royle Worm Geared Tubing Machine No. 2." John Royle & Sons, Paterson, N. J. In this 4-page, loose-leaf bulletin the leading features of this popular machine are briefly described. The interchangeable motor base is a Royle feature allowing the most economical use of floor space and efficient machine grouping. The machine is equipped with variable speed conveyor drive and soapstone tank as optional features.

"Why Wait?" The General Tire & Rubber Co., Akron, O. In this small pamphlet William O'Neil, president of the General Tire & Rubber Co., goes back to the records of the 1918 dealers' conference of his company and shows that while some tire dealers complain today about the same price cutting methods of competitors, the business of his company has expanded nearly six times since the Fall of 1918.

"Moeller Dial Indicating Thermometers, Catalog Part 35." Moeller Instrument Co., 261-265 Sumpter St., Brooklyn, N. Y. This illustrated catalog describes a full line of dial indicating thermometers for industrial applications. The fixed stem type of these instruments is instantly changeable from the straight to an angle or reclined form for ease in reading.

"General Catalog of Tag Products," C. J. Tagliabue Mfg. Co., Park and Nosstrand Aves., Brooklyn, N. Y. This general catalog of more than 100 pages places under one cover the complete line of TAG controllers, recorders, dials, thermometers, hydrometers, oil testing instruments, and moisture meters. This work is more than a catalog as several pages are devoted to a pictorial story of Tagliabue products in their manufacturing processes. In addition to many applications information appears of active interest to chemist, laboratory worker, plant superintendent and, in fact, every executive of every industry.

"Assuring Production with Precision in Roll Grinding," Booklet No. 107. Farrel-Birmingham Co., Inc., Ansonia, Conn. This 24-page pamphlet discusses "A New Conception in Roll Grinding Machines," as exemplified in the Farrel heavy-duty grinder, the Farrel two-wheel swing-rest paper mill roll grinder, and Farrel grinders for rolls of special purposes.

"Why?" Firestone Tire & Rubber Co., Akron, O. This 8-page broadside explains the tire advertising situation and sets forth the facts about Firestone tires and special brand mail-order tires, concerning which there has been much controversy and resultant confusion in the minds of motorists.

"Like Magic." John Robertson Co., Inc., 123-131 Water St., Brooklyn, N. Y. This two-page illustrated bulletin shows, briefly, the mechanical wonders back of the apparent magic of lead encasing hose by Robertson presses in the modern hose making and vulcanizing methods.

"Johnson Friction Clutches." The Carlyle Johnson Machine Co., Manchester, Conn. This catalog shows various views of the new Super-Johnson clutch and specifies its advantages, particularly with regard to the new use of this clutch for high speeds. It releases instantly, all the power is used for production.

"Proposed Revision of F. S. No. 383, Federal Specifications for Rubber Stoppers." This specification was approved for promulgation by the Federal Specifications Board, Washington, D. C., on August 1, 1931, for the use of the departments and independent establishments of the United States Government.

The Vanderbilt News. R. T. Vanderbilt Co., 230 Park Ave., New York, N. Y. The issue of this periodical publication for June-July is entirely devoted to Tuads, its properties and uses as accelerator and vulcanizing agent in representative stocks adapted to every type of rubber goods manufactured. The data in this issue will prove particularly interesting to rubber compounds.

BOOK REVIEW

"Organisation des Weltkautschukmarktes." By Franz Juda. Publishers, Buchdruckerei Bavaria G. m. b. H., Wurzburg. Paper, 8¼ by 5½ inches, 104 pages, tables, bibliography.

The rubber situation and particularly the rubber market and its organization, is carefully gone into. Starting with an introductory chapter on sources and production of output of crude rubber, the author then discusses the factors governing supply and demand; prices and monopoly tendencies among producers and manufacturers; the organization of the market, that is, dealers, brokers, stocks, qualities, contracts, exchange, etc.; and finally the development of the different markets in the East and in the consuming countries.

Opinion of the leading markets is as follows: The position of London is assured as long as it has the planting companies in its hand and the estates can hold their own against native output. The growing importance of Europe as consumer of crude rubber as compared with America is another factor in London's favor. The factors tending to weaken London are precisely those that spell strength for Singapore; while, finally, New York depends on the position of America as consumer.

The author complains of the lack of reliable data so necessary in organizing the market and points to the need of such organization in different countries, and more particularly for native rubber.

A number of tables relating to areas, outputs, stocks, consumption, prices, reclaim, etc., are appended, which together with the bibliography, add value to the booklet.

Rubber Industry in America

OHIO

Christening of the "Akron"

On August 8 at Akron after being introduced by Paul W. Litchfield, president of the Goodyear-Zeppelin Corp., Mrs. Herbert Hoover, witnessed by tens of thousands of persons, stood before the world's largest lighter-than-air craft and said, "I christen thee Akron."

Immediately she pulled a beribboned cord above her head. A hatch dropped in the nose of the huge airship, and forty-eight pigeons were released, circled seeking a way out, and escaped from the hangar. Then slowly, steadily, and noiselessly the ship lifted about six feet, floating on her own buoyancy for the first time.

Mr. Litchfield opened the ceremony by briefly outlining the history of airship development in Akron, then introduced David S. Ingalls, Assistant Secretary of the Navy for Aeronautics. Mr. Ingalls was followed by Rear Admiral Moffett, the man who, more than anyone else, is responsible for the navy's airship development. Mr. Moffett outlined the purposes to which the *Akron* will be devoted and proposed a second larger ship than the *Akron*. After his address Mrs. Hoover named the ship.

The U. S. S. *Akron*, construction of which was begun in November, 1929, by the Goodyear company for the United States Navy, has a nominal gas volume (gas cells 95 per cent full) of 6,500,000 cubic feet. Her length over-all is 785 feet; height over-all, 146.5 feet; while her maximum diameter is 132.9 feet.

Her water ballast system includes forty-four rubber fabric storage bags connected by piping, each of which is equipped

with a quick discharge valve operated from the control car. Some of the bags are near the bow and stern and serve especially as emergency ballast and for correcting the trim of the airship. The remaining bags are along the length of the craft and may be used for emergency purposes, but their major function is to serve as storage bags for recovered ballast water.

The 6,500,000 cubic feet of non-inflammable, non-explosive helium gas, which provides the lift necessary to keep the *Akron* aloft, are contained in 12 separate cells located throughout the length of the ship. To construct these cells, which took shape in the Goodyear balloon room, 60,000 square yards, or more than 12 acres, of fabric were used.

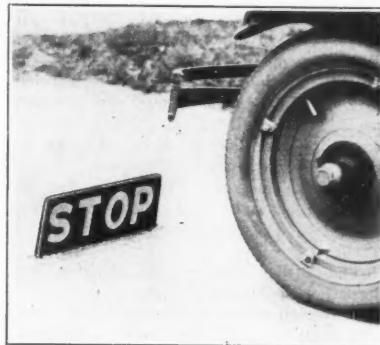
The largest of the cells contains almost 1,000,000 cubic feet of gas, nearly half the total amount carried in the Navy dirigible *Los Angeles*; while the smallest cell in the *Akron* has a capacity of nearly 100,000 cubic feet.

About half the cells for the new Navy airship are of rubber-paraffin construction, consisting of rubber-impregnated fabric over which paraffin has been spread. In actual use cells of this type have demonstrated they are efficient and inexpensive, although not quite so low in resisting diffusion of gas as those of goldbeaters skin.

As a sort of compromise between goldbeaters skin and rubber-paraffin, Goodyear research engineers developed a new "gelatin-latex" process for manufacturing gas cells. Test cells of this material have shown a performance comparing favorably with goldbeaters skin in gas retention, meanwhile keeping their durability and

flexibility over long periods of time, and the remainder of the cells for the *Akron* are made of this new fabric.

Commander Charles A. Rosendahl is in charge of the *Akron's* crew. Test flights are expected to be made very soon.



General's Rubber Traffic Signals
Rubber Traffic Signals

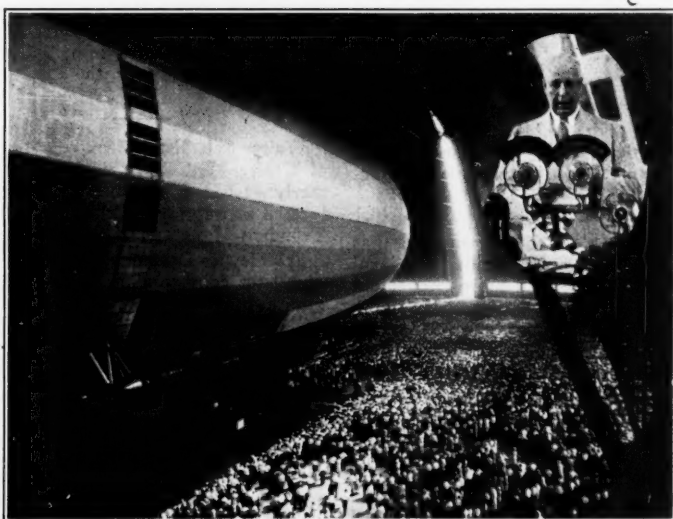
PATENT rights for the manufacture and the national distribution of rubber traffic signals have just been acquired by the General Tire & Rubber Co., Akron, which has already gone into production on them, according to Vice President Charles J. Jahant.

This traffic signal consists of a flexible rubber panel 22 inches long, standing upright in the pavement, 7 inches high, with letters of yellow rubber vulcanized into the rubber background. A cleated base of creosoted wood, with brass anchor plates is enclosed in a rustproof aluminum case.

The signal is embedded in the pavement in the middle of the street or traffic lane, directly in the line of the driver's vision. It may easily be read for a distance of 500 feet in the daytime and, being directly in the focus of the headlight, for a distance of 250 feet at night.

"Rubber traffic signals have many points of advantage over other kinds of signs intended to regulate traffic," said C. O. Buckmaster, manager of accessory sales. "They are directly in the line of the driver's vision, and not likely to be obscured by cars parked at the curb. They are not obscured by snow or dirt but stand upright and are visible at all times. Being flexible, they bend down to the pavement when a car runs over them."

In addition to the ordinary "Stop" signs to be placed at the entrance to through streets, the signals will include signs of many other kinds, such as: "one way," "safety zone," "no U-turn," "no left turn," "school—slow," "keep right," "exit," "entrance," "stop-railroad crossing," "right turn," and others.



The U. S. S. *Akron* (Insert) President Litchfield Addressing the Huge Throngs at the Christening Ceremony

Goodrich Activities

Forty thousand employees of The B. F. Goodrich Co., Akron, their families and their friends, attended the annual Goodrich Play Day at Euclid Beach Park, Cleveland, August 10. The outstanding event of the day was the bathing ensemble revue, in which 62 departmental contestants modeled Goodrich and Miller bathing accessories. Miss Eleanor Gregory, International B. F. Goodrich Corp. stenographer, won the contest.

A children's bathing beauty contest, the usual sport program, and a baseball game between the Goodrich and the Miller teams also made up the program. Miller defeated Goodrich 7 to 1 in the ball game. Nearly 10,000 automobiles, special trains, and buses carried the picnickers to the park. Other Goodrich factories observed Play Day on the same date.

With an improvement in the accident rate of 75.47 per cent over the previous period the Goodrich mechanical division won the John Noonan Safety Trophy for the first six months of this year. It was the second successive victory for that department, which will gain permanent possession of the trophy by winning it again.

The Miller Rubber Co. division was second with 74.73 per cent.

Goodrich awarded 20-year service pins last month to the following employees: Allen Barrett, processing division; John Glennen, maintenance department; C. A. Scott, Philadelphia Rubber Works Co.; John Welfley, tire division; Ernest Welton, plant protection; Charles P. Ross, mechanical division; and H. S. Carly and J. L. Kelley, both of Pacific Goodrich Co., Los Angeles, Calif.

George Madole, assistant managing director of the Societe Francaise B. F. Goodrich, Colombes, France, is in Akron studying American tire manufacturing methods. He was formerly of Kent and a Goodrich experimental department employee for several years in Akron.

Goodrich President Very Optimistic

James D. Tew, Goodrich president, and head of the Rubber Manufacturers' Association, when interviewed during his visit to Pacific Coast trade centers, stated that he had found conditions there, and in fact throughout the remainder of the country, very encouraging. He said:

"The general state of the rubber industry at the end of the next six months will be very satisfactory. Meanwhile the price of rubber is not likely to fluctuate more than a point and a half at the most. The rubber industry, too, has become more efficient. We can make a profit on a smaller volume of business because our operating expenses have been greatly decreased.

"The industry is not making the mistake now of carrying heavy inventory. It went into the 1930 depression with far less stock on hand than it went into the 1920 slump. This improvement has been made possible largely through improved transportation and delivery service which enable factories to get supplies more easily and quickly than ever before, thus making it unnecessary to carry large stocks. Where the Goodrich concern formerly carried six

months' supply, it now carries but two or three months' stock on hand."

Referring to the Los Angeles branch factory, Mr. Tew said that the plant was being so well operated that it can take out its share of expenses and still have a profit. While it is now making tire and tubes solely, as soon as business conditions are stabilized, it will diversify its products considerably. He had already intimated that the making of footwear would be undertaken there when market conditions are more favorable.

Mr. Tew is scheduled to address the fall meeting of the Great Lakes Regional Advisory Board on September 23.

"Zero Pressure" Tire

A tubeless tire having more cushioning effect and greater tractive ability than either pneumatic or solid tires has been developed by the Goodrich company for industrial and agricultural tractors. Goodrich has named the new development the "zero pressure" tire. Its construction is a rubber arch built on a perforated steel base for application to standard solid tire wheels. The piers of the arch are of sufficient size and rigidity to provide ample load capacity. The all-rubber arch or tread is made flexible to give full tread contact under the comparative light loads of tractors, and through this flexibility and full contact a traction exceeding that of either solids or pneumatics is provided. The tire is not under air pressure; consequently a penetrating obstacle will cause no damage or delay.

This new tire was proved in the citrus groves of Florida and on the rural highways of Iowa, tests which demand the utmost in tire performance, from the standpoint of both durability and traction. Goodrich is making the tires in 34 by 7 and 46 by 11 sizes. Other sizes are planned.

S. A. E. National Meetings

The Society of Automotive Engineers in conjunction with the National Air Races will hold its Twentieth National Aeronautic Meeting at Hotel Statler, Cleveland, O., September 1 to 3. Its Production Meeting will be held at Book-Cadillac Hotel, Detroit, Mich., on October 7 and 8; while the Transportation Meeting at the Shoreham Hotel, Washington, D. C., is scheduled for October 27 to 29.

A. Schulman's, Inc., Akron office has been moved from 521 Second National Building to larger and more convenient quarters at 614 in the same building. Changes in personnel include: Arthur Falovesh, a recent addition to the Chicago force, who was formerly with H. J. Seidenberg, of Chicago, and the transfer of Milton Kushkin from Chicago to the New York office.

William O'Neil, president of The General Tire & Rubber Co., Akron, spent his vacation at Rice Lake, Canada, fishing for pickerel. He was accompanied by Frank D. Gable, General factory engineer, and George Garrity, of the General sales force.

Goodyear Notes

The Goodyear Tire & Rubber Co., Akron, through President Paul W. Litchfield, presented Eli E. Pound, truck and bus salesman at Richmond, Va., with a Litchfield Medal for being the best all-around domestic salesman for 1930. Mr. Pound, who has been with the company since 1918, has the honor of being the first member of the sales force to win the medal.

Goodyear executives are studying plans to stabilize employment through the winter by holding the total number of factory employees at the present level. The seasonal falling off in tire consumption will be met by adjustments in the length of hours per week worked by employees. While no commitment has been made that there would be no layoffs, President Litchfield in a recent statement characterized the plan as "an attempt to peg unemployment at its present levels." Mr. Litchfield feels that the plan, if worked out, would give present employees assurance of work throughout the winter and would tend to prevent unemployed of other towns from coming into Akron to find work and so add to relief problems there.

Despite the almost universal use of automobiles throughout the twelve months, the seasonal element is still a definite factor in the tire business. Only about half as many tires are being bought in the winter months as in the summer. The four months, June-September, are responsible for 42 per cent of the car owners' purchases of tires, while November and December total about 12 per cent.

The tire manufacturers have sought to even off these peaks and valleys of demand by the "spring dating system" under which tire dealers buy as high as one third of the year's requirement in December and January for delivery after January 1, with payment spread over 90 days instead of the usual 30-day period. These spring dating orders give the manufacturer a backlog to hold his production organization together after the first of the year but leave him still with a personnel problem for the last months of the year.

Walter Scheffler, Akron representative of Utility Mfg. Co., Cudahy, Wis., formerly at 633 E. Exchange St., is now located at Aster and Palm Aves., Akron. Telephone Jefferson 0118.

Schibley & Ossmann, Inc., distributor of rubber compounding ingredients, last month moved its offices to 33 Public Square, Cleveland. Telephone: Main 5122-23.

The Interstate Commerce Commission refused to grant reparation to leading tire companies in Akron for alleged unreasonable freight rate charges on shipments of pneumatic tires and related products to destinations in the southwest. Companies appealing to the commission in the case were: Firestone Tire & Rubber Co., General Tire & Rubber Co., B. F. Goodrich Co., Brunswick Rubber Co., and Seiberling Rubber Co.

EASTERN AND SOUTHERN

Activities of A. S. T. M.

The Committee on Rubber, D-11 of the American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa., has summarized its activities for the coming year as follows:

Subcommittee I on Hose is preparing specifications covering methods of test for wrapped, braided, cotton rubber-lined, and wire reinforced hose.

Subcommittee II on Belting is preparing a specification on methods for testing rubber belting of various classes. Standard specifications for linemen's blankets also will be prepared and submitted for approval.

The Subcommittee on Insulated Wire and Cable expects to offer a tentative performance specification covering insulated wire. This subcommittee is very active in revising the present specifications on insulated wire and is cooperating with the National Electric Manufacturers Association.

Subcommittee IX on Insulating Tape plans to undertake a thorough study and revision of both the specifications under its jurisdiction; namely, the Specification for Friction Tape and Tentative Specification for Rubber Insulating Tape. During the coming year the subcommittee will investigate and revise both of these specifications and bring them strictly up-to-date.

D-15, Standard Methods for Testing Rubber Products, will be investigated by the subcommittee in charge. It is anticipated that Method D-15 will be revised to constitute a separate specification on physical testing and include only general physical testing methods as applied to rubber goods.

In Subcommittee XV, on Life Tests, standard methods are being prepared for carrying out the Geer Oven aging and Bierer Oxygen Bomb tests. This standardization work is of extreme importance to the industry, and the subcommittee is cooperating with the Committee on Physical Testing of the Rubber Division of the American Chemical Society.

The Committee on Rubber Products for Absorbing Vibration will continue the work now in progress for the development of a standard method for flow testing on rubber used for absorbing vibration. This

work is of great importance in the automotive field and is complicated by the fact that nearly all automotive companies do considerable testing along these lines but rarely agree as to the methods which should be employed.

Subcommittee XVIII, on Dynamic Fatigue Testing, is a new committee. It has before it an important field for investigation in test methods of the performance type. Such tests involve the effect on rubber goods of repeated stretching and bending so carried out as to cause failures through fatigue. This work will be of considerable duration since little is known now regarding the causes of fatigue failures with rubber goods. Information in this field is very limited beyond knowledge of the fact that fatigue failures do occur. The more recent developments in rubber testing are nearly all in the field of this subcommittee, and it is believed that an excellent opportunity for service is thus afforded the committee.

Rubber or Fabric Belting Replaces Leather

The replacement of leather belting by rubber or fabric belting is advocated by Cason J. Callaway, president of the American Cotton Manufacturers Association, as a method to increase the consumption of cotton. This recommendation is now effective in the Callaway Mills, Inc., La Grange, Ga., as indicated by the following from a letter sent to all plant superintendents of that organization:

"With the exception of gainer belts for winders, 100 per cent replacement of all belts in your mill are to be rubber or fabric, as far as purchases are concerned. The small amount of leather belt on hand can be used, but hereafter every foot of belt bought shall be rubber or fabric, other than the gainer belt referred to."

Synchronized Rubber Conveyers

Reduction in wastage and simplification of operation result from application of the Thyatron tubes to the synchronizing of rubber conveyers. Much of the processing work in a rubber factory depends upon conveyers, and the speeds of the various conveyers in a chain should be synchron-

ized. Synchronization is accomplished in the following manner:

The first conveyer, or the one receiving the original supply of material, is driven at fixed speed, depending on the material, and the other conveyers are synchronized with this key conveyer. The material, as it passes along, dips slightly between any two conveyers. In each of these dips rides a wheel attached to a balanced lever mechanism, which, at its other end, governs the movement of the core in a reactor. Variations in the reactance of the reactor control the output voltage of a pair of Thyatrons in the circuit of the motor driving the conveyer, the speed of which it is desired to govern.

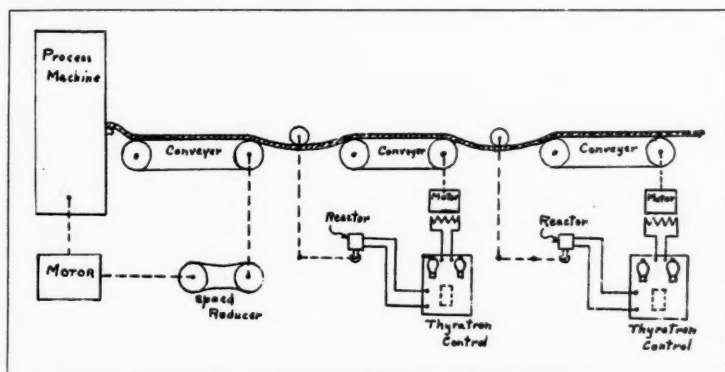
When a conveyer is running too fast for the preceding one, the slack material between them tightens, the rider wheel rises, the position of the core in the reactor is changed, the Thyatron tubes pass more current to the motor field, and the motor slows down. Conversely, when the conveyer is running too slow, the reactor core moves the other way, causing the Thyatron tubes to pass more current, and the motor speeds up. As a result the tension between conveyers keeps the speeds in synchronism. General Electric Co., Schenectady, N. Y.

National-Erie Corp., 16th and Raspberry Sts., Erie, Pa., manufacturer of steel castings, gears, coal-cutting machinery, and rubber factory equipment, last month closed down its plant entirely for an indefinite period. Negotiations have been under way for the acquisition of a controlling interest in National-Erie by the Bucyrus-Erie Co., manufacturer of steam shovels.

United States Rubber Co., 1790 Broadway, New York, N. Y., through President F. B. Davis, Jr., announced the consolidation of the Mechanical Goods Department and the Chemical and Reclaiming Department into one department to be known as the Mechanical Rubber Goods Department. It will have three general subdivisions: Mechanical Rubber Goods Division, Chemical and Reclaim Division, and Latex Division. Elmer Roberts, formerly general manager of the Chemical and Reclaiming Department, has been appointed general manager of the new department, and Walter Gussenhoven, formerly general manager of the Mechanical Goods Department, has been appointed general manager of sales.

Vulcanized Rubber Co., Morrisville, Pa., anticipates a boom in the hard rubber output in the Fall. The company's business generally increases at the close of the Summer.

The Rubber Trade Association of New York, Inc., 33 So. William St., New York, N. Y., on August 27 gave a farewell luncheon to Kiyoshi Miyazaki, for the past fourteen years manager of the rubber department of Mitsui & Co., Empire State Bldg., New York. Mr. Miyazaki is returning to Japan to take up his duties with the central Mitsui organization there, and the luncheon was



Synchronizing Conveyers in a Rubber Factory

given as a testimonial of the New York rubber fraternity's esteem and friendship for the brilliant Mitsui manager. The affair was held at the India House, with William Bruyn, of L. Littlejohn & Co., acting as toastmaster.

Century Carbon Co., 365 E. Illinois St., Chicago, Ill., controlled and operated by Wishnick-Tumpeier, Inc., announces the acquisition of Union Gas Products' properties at Swartz, La. These properties comprise complete gasoline absorption plant, carbon black plant, and gas producing wells and acreage. This acquisition rounds out the carbon black manufacturing activities of the Century Carbon Co. and places it in a strong position, making the unit complete and entirely self-supporting.

The C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., well-known manufacturer of instruments for indicating, recording, and controlling temperatures and pressures, as well as industrial thermometers, recently announced the promotion of A. F. Rucks to the position of general sales manager. Mr. Rucks has been connected with the company for 18 years and for the past four years has served as assistant to Vice President L. C. Irwin.

Philip Sievering, Inc., electroplating and polishing, 199 Lafayette St., New York, N. Y., does considerable chromium plating on molds for the rubber and the bakelite trades.

The Eastman Kodak Co., Rochester, N. Y., instead of using an ordinary rubber band around a roll of safety films for Ciné-Kodaks now features a rubber band having a small triangular projection, band and triangle all of one piece, to facilitate removal of the band.

Gordon Mfg. Co., 110 E. 23rd St., New York, N. Y., manufactures suction cups. Officers are: president, Wm. Gordon; vice president, W. J. Gordon; and purchasing agent, David Schneider.

Chas. W. Kopp Co., 57 N. E. 20th St., Miami, Fla., handles tube patching, inside shoes and b. o. boots, valve cores, rubber and gasket cement, tire paint, and fan belts. Chas. W. Kopp is proprietor, and J. M. Dean, purchasing agent.

The Masland Durable Leather Co., Amber and Willard Sts., Philadelphia, Pa., makes Masland artificial leather, Dura-hyde, and Leth-R-Flex leather substitutes, radio loud speakers, hinge rings, and waterproof cements. Executives include: Walter Masland, president; J. Wesley Masland, secretary and treasurer; and D. T. Detwiler, purchasing agent.

Monarch Mfg. Works, Inc., Salmon and Westmoreland Sts., Philadelphia, Pa., manufactures hard rubber spray nozzles. W. Czarnecki is president; M. Czarnecki, vice president; and Thos. W. Murphy, secretary and treasurer.

The Cantslip Mfg. Co., 38 Murray St., New York, N. Y., manufactures Cantslip bathtub, shower stall, and drainboard mats, Stand-sure bathtub mats, sink mats, and other rubber specialties. G. A. Lepke is owner.

NEW ENGLAND

President Corone W. I. Inc.

E. Howard Johnson, president and organizer of the Corone Wire Insulators, Inc., Putnam, Conn., besides being a successful business executive also has invented straining and tubing machinery for the industry to which he has devoted a lifetime. He has well served the Kerite Insulated Wire & Cable Co., Inc., New York, N. Y., the Hazard Mfg. Co., Wilkes Barre, Pa., and the Standard Underground Cable Co., Perth Amboy, N. J.

Then from its organization in 1902 until 1924 Mr. Johnson, as vice president and works manager of the Atlantic Insulated Wire & Cable Co., Rome, N. Y., by his knowledge of rubber and his mechanical and managerial ability so guided the destiny of the company that it achieved success and distinction in manufacturing high grade rubber covered wires and cables of nearly all types, including submarine cable in continuous lengths up to 100 miles, many hundreds of miles of which were furnished the United States Government.

After retiring from the Atlantic company he organized the Corone company, which later was incorporated in 1928. From its inception it has conducted a profitable business in special high tension mixtures for wire insulations, together with marketing Mr. Johnson's patented Super Production straining and tubing machines.

Taunton Rubber Co., Taunton, Mass., in its general line of molded goods includes the small molded rubber cores used in the center of golf balls and also rubber thread used in winding these balls.

W. B. Wiegand, of Binney & Smith Co., New York, N. Y., returned early last month from an extensive business trip to England and the Continent.

The Fowler & Union Horse Nail Co., Inc., 1000 Military Rd., Buffalo, N. Y., manufacturers of horses' hoof pads and other molded rubber products, has the following officers: president, Carlos F. Stoddard; vice president, Louis E. Stoddard; secretary, J. Dwight Dana; and treasurer, Olin L. Dibble.

W. H. Reed & Co., 479 Stephens St., S. W., Atlanta, Ga., under the sole ownership of W. H. Reed, manufactures Ikena sanitary rubber protectors and reinforced rubber finger cots.

Optimit Rubber Works of New York, Inc., 426 W. 14th St., New York, N. Y., imports from its factory in Czechoslovakia rubber threads for all purposes, elastic fabrics, golf balls, raincoats, balls, mats, rubber sponges, etc. Officers are: Conrad Tiring, president; Paul Schapfing, vice president and treasurer; and M. M. Hochtteil, secretary.

The Deane Plaster Co., 151 Ludlow St., Yonkers, N. Y., manufactures medicated plasters and surgical dressings. C. C. Deane is president, treasurer, and purchasing agent; G. C. Deane, vice president and secretary; and K. L. G. Deane, assistant vice president.

The United Elastic Corp., Easthampton, Mass., has consolidated its two local divisions, the Glendale Elastic Fabric Co. division and the George S. Colton Elastic Web Co. division. Harold W. Conant, assistant treasurer, said there would be no curtailment of production or reduction of official personnel.

Samuel Barrabee, Inc., Boston, Mass., Firestone tire and tube retailer, has opened a new service station at Watertown, Mass.

Clifton Mfg. Co., Jamaica Plain, Mass., newly organized and recently purchased by the Stedfast Rubber Co., has elected the following new officers: William Sudeman, president; J. J. Clifford, vice president; A. Sudeman, treasurer; A. P. Grossman, secretary; and A. E. Manter, acting general manager.

James M. Linnehan Co., Boston, Goodrich dealer, has moved its headquarters from Federal to Boylston St. in the heart of the Boston tire retail and wholesale district.

Reading Rubber Mfg. Co., Reading, Mass., has appointed J. R. Geenty chief chemist in place of F. H. Springer, who resigned to join the Davol Rubber Co., Providence, R. I.

The Alfred Hale Co., North Quincy, Mass., has changed its "Rajah Special" to "Rajah Celulite," which is a new and improved rubber compound for sport soles.

Alling Rubber Co., 167-169 Asylum St., Hartford, Conn., wholesale and retail distributor of rubber goods, has completed thirty years of continuous service in the rubber business under the able management of Amos P. Mitchell, president and general manager. The company owns one of the outstanding chain of rubber stores in Connecticut and southern Massachusetts.

Plymouth Rubber Co., Inc., Revere St., Canton, Mass., is now working on full time and 700 employees are assured of steady work during the winter. The plant will be enlarged to take care of increased business, and more workmen will be employed.

Davidson Rubber Co., 50 Brighton St., Boston, Mass., reports increase of sales each month over the preceding one with the plant working full time in all departments and double shift in one department. E. J. Casey is general manager.

Destroy Surplus Stocks?

"Let governments determine how much rubber is exportable and then burn the surplus," is one suggestion offered for the relief of distressed estate owners in the Far East. Too uneconomic! American corn growers once made huge bonfires of crops in excess of foodstuff demand. Now such surplus goes largely into solvents and other chemicals, and hitherto useless stalks become building material. New uses may be found, too, for excess raw rubber. Wanton waste is poor policy in any industry.

MIDWEST

National Safety Council, 20 N. Wacker Dr., Chicago, Ill., will hold its twentieth annual safety congress at Stevens Hotel, Chicago, from October 12 to 16 inclusive.

Multibestos Co., Cambridge, Mass., manufacturer of brake lining and clutch facings, has added Clarence F. Boothe and C. L. Swander to its Chicago, Ill., staff. Mr. Boothe is connected with the Chicago Multibestos Brake Service Institute and before joining the Multibestos Co. was associated with the Eaton Bumper & Spring Co. and the Wagner Electric Corp. as shop superintendent. Mr. Swander has been appointed sales representative with headquarters at the Multibestos Chicago office. For the last year he was with the John Bean Mfg. Co., manufacturer of brake testing equipment. Prior to that he was associated with the Burton & Rogers Mfg. Co.

Garfield Mfg. Co., 3055 Lawrence Ave., Chicago, Ill., makes Lather Quick sponges. Officers are: president and treasurer, Walter Jacobson; vice president, D. Zurlinger; and secretary, L. Seifert.

Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., has appointed John J. Stanton, merchandise manager of the northwest district since 1926, Milwaukee, Wis., manager of the firm. Mr. Stanton, born and educated in New York, joined Westinghouse in 1916 as a salesman traveling the state of Wisconsin.

The Premier Rubber Mfg. Co., Dayton, O., announces the appointment of William R. Fitzgerald as district representative in Detroit, Mich., to succeed F. W. Murray, resigned. Offices in the General Motors Building are retained.

Ralph H. Nesmith, formerly with the United States Rubber Co., at one time plant engineer of the Providence, R. I., tire factory, and in recent years in the Engineering Department of the Detroit factory, has opened an office at Room 605 Kerr Building, Detroit, Michigan, for the engineering and sale of mechanical specialties.

Firestone Tire & Rubber Co., through J. Fred Cast, manager of the Manufacturers Sales Department, Firestone Detroit District Bldg., Trumble & Grand Aves., Detroit, Mich., announced the appointment of C. A. Jessup as a member of that department. Mr. Jessup, who has had 20 years' experience in manufacturers' sales, is to be associated with both passenger car and truck tire sales. Prior to joining the Firestone organization he served as a branch manager at Cleveland, Los Angeles, St. Louis, and Detroit, and as manager of manufacturers sales located at Detroit for the past seven years.

Shaler Co., of Milwaukee and Wau-pun, Wis., will add approximately 300 salesmen to its force during the next few months through the addition of another product, a concoction which, among its other thousand of uses, may be put onto door locks and hinges of new automobiles.

Late Summer finds the rubber industry holding its own, with manufacturers hoping for the best for Fall and Winter. Demand for certain mechanical goods continues well, while orders still come in for summer rubber footwear and rubber cloth. Hard rubber production shows considerable improvement, but tire production remains unchanged. When the season becomes dull, some manufacturers keep the employees busy producing samples.

Essex Rubber Co., Trenton, reports that production of recreational goods has been well maintained during the Summer and that this August has equaled the same month during the past three years. Company officials say conditions indicate better business in September.

Joseph Stokes Rubber Co., Trenton, operating at capacity, is optimistic over a good Fall season. President William J. B. Stokes is with his family in the Pocono Mountains. The company's plant in Welland, Ont., Canada, is very busy at this time.

Pocono Rubber Cloth Co., Trenton, announces that business continues good, with a full shift working in each department. The company recently suffered slight damage when flames destroyed a portion of the drying room and burned some raw material.

Israel Richmond, proprietor of Richmond's Tire Shop, Trenton, is erecting a service station in the center of the city and will move there shortly.

Mercer Rubber Co., Hamilton Square, finds business has decreased slightly during the past month.

Fineburg's, Inc., 10 E. Hanover St., Trenton, has purchased a four-story structure with 25,000 square feet of floor space at 636-40 E. State St. for distributing automobile supplies, tires, and radios. Herman Fineburg started the business twelve years ago as a one-man enterprise; he is now president and general manager of the concern. Other officers are: Samuel Fineburg, vice president; Isaac Fineburg, treasurer; and Irving Cohn, secretary. The firm has forty employees.

Thermoid Company, Trenton, has issued a financial report showing earnings of \$216,580 during the first half of the present year. The figures represent two and a half times the interest requirement, amounting to \$2.21 per share on preferred stock. The figures are exclusive of the Southern Asbestos Co., a subsidiary, profits of which for the same period were \$8,993, after deducting depreciation. F. Robert Lee, Thermoid vice president, has been on an extended business trip through the Far West. The company is operating normally in all departments.

Rodic Rubber Corp., South Ave., Garwood, makes typewriter platens, rubber covered rolls, casters, and wheels, and stamp gum. Executives include: Edward D. Taylor, president; William S. Coleman, vice president; Maurice J. Sullivan, secretary; Charles T. Dickey, treasurer; and Ernest G. Maihack, purchasing agent.

NEW JERSEY

Whitehead Bros. Rubber Co., Trenton, now operates a full week in all departments. The Goodall Rubber Co., a subsidiary, which recently purchased the equipment of the Rubberhide Co., Randolph, Mass., has begun manufacturing rubber footwear with leather, fiber, rubber, composition, and felt soles. Several employees have been added to the new department.

Pierce-Roberts Rubber Co., Trenton, reports no change in production during the past month. The company operates five days a week.

Edward W. Moore, appointed statutory receiver of the Paramount Rubber Consolidated Co., both of Paterson, is conducting the business of the concern. Application for the appointment was made by William Harris on behalf of the Hudson Plaza Mortgage Co., a creditor on overdue notes. The complainant stated that Paramount was organized in Delaware in 1919 with an authorized capital of 20,000 shares of 7 per cent cumulative preferred stock and 100,000 shares of common no par. About 5,950 shares of the preferred and all the common are outstanding. No dividends have been paid on the preferred since 1924.

Carl F. Ogren, prominent in the rubber field, recently talked on "The Rubber Industry" before members of the American Business Club, Trenton.

Bruce Bedford, president of the Luzerne Rubber Co., Trenton, has returned with his family from a trip to Quebec, Canada.

Ralph W. Tobin, vice president of the Woven Steel Hose & Rubber Co., Trenton, is spending the Summer with his family at Belgrade Lakes, Me.

George R. Cook, president of the Acme Rubber Co. and the Hamilton Rubber Co., both of Trenton, is enjoying the Summer with his family at Blooming Grove, Pa.

Charles E. Stokes, president of the Home Rubber Co., Trenton, has been in Chicago some time.

Baxter Rubber Co., 163 Mulberry St., Newark, of which Chas. E. Baxter, Sr., is proprietor, and Chas. E. Baxter, Jr., purchasing agent, handles mechanical rubber goods, footwear, clothing, etc.

Weldon Roberts Rubber Co., 18 Oliver St., Newark, is altering its factory at 361-65 Sixth Ave., at an estimated cost of \$40,000.

American Salpa Corp., Spotswood, manufacturer of imitation leather and other specialties in which latex is used, will be sold at receivers' sale September 1. Israel B. Greene, Lefcourt Building, Newark, represents the receivers.

Smith & Gregory, well-known accessory dealers who have been located for many years at 12 Orange St., Newark, have leased the corner store at 469 Broad St., where modern automobile accessory display rooms will be opened.

The Amster Tire & Auto Sales Co., Newark, has recently been organized by E. R. Ossman and Samuel and Martin Amster.

PACIFIC COAST

Although other business experienced some seasonal slowing down last month, the rubber trade generally found demand well sustained for its major products, as well as for many specialties. The outlook for an early upturn is regarded as very favorable. Most of the tire companies and their distributors are particularly optimistic. Concerns supplying rubber requirements of building firms are encouraged with the increased activity in construction work. Several large installations of rubber tiling in new office buildings have been reported, and a cessation of the gasoline price war and a larger crude oil output for August have resulted in a better demand for the rubber goods utilized by drillers, pumpers, and refiners. Dealers in compounding and other ingredients for rubber manufacturers state that sales are steadily improving and that a more confident tone is shown by factory heads.

Pacific Balloon Co., which since 1919 has been manufacturing toy balloons in Riverside, Calif., has ceased operations in that city and in August moved its plant and offices to a new building at 3570-74 W. First St., Los Angeles, Calif. The making of balloons will be discontinued, and instead the company will act as sole distributor for all the balloon and other products of the Pioneer Rubber Co., Willard, O., between the Rockies and the Pacific Coast. The goods will be assembled in Los Angeles and there dyed and printed; improved equipment has been provided for the operations. The concern is already running at top speed and expects to show a 50 per cent gain in 1931 sales over the 1930 total. The company officers are: president and general manager, Louis F. Reed; vice president, J. C. Gibson (president of the Pioneer Rubber Co.); secretary and treasurer, Elyse F. Reed; sales manager, George D. Stineman. Mr. Gibson recently was on a business trip to the Pacific Coast.

The Garlock Packing Co., Palmyra, N. Y., according to San Francisco District Manager C. D. Allen, reports gradually improving business for the first half of the present year, although it has eased up somewhat since. Generally speaking the outlook is good. The company has two regularly constituted branches on the Coast, the San Francisco one at 671 Mission St., in charge of Mr. Allen; and the Los Angeles one at 2303 E. Eighth St., in charge of C. W. Harmon. A small factory and a warehouse are maintained in San Francisco. Connected with the latter city are two sub-branches, one at 1212 Sixth Ave. S, Seattle, Wash.; and the other at 230 Stark St., Portland, Ore. J. L. Luckey is in charge in Seattle, and J. L. Young in Portland. The Spokane territory is looked after by A. B. Davis, the district drawing supplies from the three cities named.

Willard Storage Battery Co. of California for the first time since its establishment on the Coast is running its factory on Ninth St., Los Angeles, at full capacity, and reports a record run for July and the greater part of August. Hard rubber cases and threaded rubber separators are used.

The rush is attributed to the fact that motorists are using old cars largely and "peppering" them up with new batteries. That business is better on the Coast is indicated by the fact that the Cleveland, O., main factory is not yet running at full capacity.

United States Rubber Co.'s Samson Division factory in Los Angeles, Calif., which closed down July 31 and August 1 for inventory taking, reopened August 3 and has since been operating six days a week with three shifts daily in all departments. Daily production averages over 4,000 tires. Reports from General Sales Manager J. B. Magee, who has been visiting all the trade centers as far northwest as Spokane, state that business prospects are very encouraging. The employees were given a holiday on August 26, when they held a picnic in Brookside Park, Pasadena.

E. I. du Pont de Nemours & Co., Inc., notes through its dyestuffs department, and based on sales for the past half year, a steadily improving condition in the rubber industry on the Coast. The company makes many of the rubber accelerators, softeners, antioxidants, and organic coloring substances used by Pacific Coast manufacturers. The firm believes that conditions in the rubber trade will gradually grow much better in this section. The company's main office on the Coast is at 351 California St., San Francisco, and is in charge of J. W. Cleveland.

Rubbercraft Corp. of California, Ltd., 110-14 E. 17th St., Los Angeles, with its factory in Torrance, both in California, finds business holding up very well. Sales are especially good of two specialties originated by the company, OSO-Soft pneumatic air cushions and mattresses, with general mechanical molded goods in fair demand. The officers of the company are: president, Charles N. Merralls; vice president, Carl Blattner; secretary-treasurer, Roy R. Musser.

Pacific Goodrich Rubber Co., Los Angeles, Calif., notes a gradual betterment in sales of tires and finds it necessary steadily to increase production. Some 1,200 attended the fourth annual picnic held by Goodrich employees at Brookside Park, Pasadena, August 11. The general committee consisted of Harry Meiser, chairman; A. W. Phillips, W. Richard Hucks, and J. A. Clark. Appropriate to the La Fiesta idea for the celebration of Los Angeles' 150th anniversary, the committee was in full Spanish regalia.

Robert S. Milar, formerly of the production and creative divisions of the Firestone Tire & Rubber Co. advertising department, has been appointed division sales manager for the Penn Heat Control Corp., with headquarters at Portland, Ore.

T. J. Barker Rubber Co., 1346 E. Slauson Ave., Los Angeles, Calif., recently installed what is stated to be the largest hydraulic presses set up west of Akron, O., for making rubber floor covering, runners, rugs, and typewriter pads. The rubber is $\frac{3}{8}$ -inch thick, tough and resilient, and is made by a unique process of reclaiming

inner tubes whereby the colors are retained and the cost reduced to but a third of compounded rubber; the cost of the finished product is less than that of linoleum. Sales of the pads are especially good among schools. Business has been increasing so well lately that the factory now runs on two shifts daily.

Goodyear Tire & Rubber Co. of California is maintaining an exceptionally good output of tires at its Los Angeles plant, and one which is said to compare well with the summer average of last year. The prospects for the remainder of the year are said to be very good. Most departments have been working three shifts daily. W. Visel, in charge of advertising, having been transferred to another post, has been succeeded by Fred R. Harrin. The Goodyear blimp Volunteer, according to Pilot Verner L. Smith, has been making new records for staying aloft for the greatest number of consecutive days. Already it has doubled the performance of any non-rigid lighter-than-air craft in this way, and without accident to ship or passengers.

Firestone Tire & Rubber Co. of Calif. reports no sign of a let-up in tire making at its Los Angeles plant. The factory is running six days a week, with three shifts a day, and steady additions are being made to the working force. The output is said to be quite up to the heavy production schedule set for the plant. Vice President and General Sales Manager R. C. Tucker has been visiting the district offices and service stations of the company in the Northwest and reports that the outlook for the remainder of the year is excellent.

Industry and Trade

From Report of National Industrial Board

Automobile production declined 14 per cent in July with output in the United States and Canada estimated at 221,500 passenger cars and trucks. The seasonal swing between June and July is normally a decline of 7 per cent.

During the first seven months 1,856,000 motor vehicles were produced, declining 28 per cent under the same period last year.

July new passenger car registrations for eleven states show a decline of 6 per cent under June; while new commercial car registrations for the same eleven states reflected an increase of 25 per cent over June. Manufacturers are continuing their policy of regulating production according to actual retail demand.

Consumption of crude rubber by manufacturers in the United States declined 16 per cent between June and July to a total in the latter month of 31,937 long tons; the seasonal movement is a 4 per cent decline. Consumption was, however, 9 per cent greater than it was in July, 1930.

Stocks of crude rubber on hand at the end of July increased 4 per cent over what they were at the end of June. Totalling 234,822 long tons, they were 54 per cent greater than they were a year ago.

Crude oil production in July averaged 2,500,000 barrels per day which represents practically no change in average daily output over that for June. Output in July was at approximately the same daily average production of July, 1930.

The total demand for gasoline, domestic and export, during the first half of 1931, as compared with the same period of 1930, indicates a 28 per cent decline; while domestic demand over the same period indicates a 2.2 per cent gain.

A Smoke Ash Filler

Rubber Chemists Hope to Utilize Coal Nuisance Product of Steam Plants

THE more thorough combustion of coal in great manufacturing centers has largely done away with the dense masses of soot that had so long defiled cities, but the more efficient stoking has, however, failed to abate a lesser nuisance due to the issuance from smokestacks of highly vaporized silicious matter that accompanies the usual gassy discharge in the burning of coal. Rubber chemists who are studying the matter, however, hope through research to help both city dwellers and their own industry.

The solid waste matter in the combustion of the larger sizes of coal may as cinders or clinkers be utilized in cement working and general construction work; but the waste solids from powdered coal, blown while ignited through boiler tubes, is an impalpably fine gray ash for which no useful purpose has so far been devised. This nuisance product reveals itself as a light colored smoke and is deposited on streets and buildings as a floury dust.

The powder has a slippery, talc-like feel, due, it is said, to its perfectly spherical particles, as shown under high magnification, varying in diameter from 1 to 50 microns, hard and transparent, some tinted with iron or other oxides, and a few quite black. The material is nearly pure silicon, an inert substance, quite resistant to high temperatures or acidic or alkaline corrosives. The minute globules are believed to have good dispersive quality, and the material may prove a desirable filler for certain rubber compounds.

Its collection in volume may now be difficult; but if the incentive of value were provided, doubtless ways and means would soon be found for gathering it cheaply. It is recalled that a few years ago carbon black went to waste as a nuisance product of combustion. Fortunately, it was discovered to be one of the most valuable of rubber compounding ingredients; a nuisance was soon abated and a great industry established, the latter being greatly speeded up when it was found that petroleum and natural gas would yield superior grades.

Just what uses might be made of the material suggested can only be conjectured. Possibly it may serve as a filler for hard packings, a substitute for mica or plumbago, for rubber flooring compounds, for rubber blocks or sheets for street paving, for battery boxes, and for various hard and soft rubber insulation compounds.

OBITUARY



L. J. Pianarosa

Pioneer Machinery Inventor

LOUIS JOHN PIANAROSA, 56, of 465 Chestnut Ave., Trenton, N. J., mechanical engineer and inventor of rubber manufacturing machinery, was fatally injured in an automobile accident at Bridgeport, Conn., July 29, and died on August 2 in a hospital at that place. Death was due to a fractured skull and pneumonia.

Mr. Pianarosa, a pioneer in the manufacture of rubber machinery, came to this country from Italy 35 years ago and settled in Boston, Mass., where he was employed by the Boston Woven Hose & Rubber Co. While conducting a machine shop at that place, he invented several rubber machines including a packing calender, rubber stock cutter, washer and jar ring lathes, the two latter being his best known inventions. Some of these machines are used by rubber manufacturers in all parts of the world. He was quite versatile as his inventions cover the textile industry, a lawn mower and several household articles.

In 1915 Mr. Pianarosa moved with his family to Trenton, where he operated a machine shop. He left Trenton last April to go to Bridgeport in the interest of the Black Rock Manufacturing Co., who makes all of the rubber machinery patented by him.

Funeral services were conducted at Bridgeport, and interment was in Mountain Grove Cemetery.

Besides his widow he is survived by a daughter.

George B. Knickerbocker

A HEART attack following an operation caused the death on August 12, in New York, N. Y., of George B. Knickerbocker, export manager of the Garlock Packing Co., Palmyra, N. Y. He had been with the company 37 years.

On November 24, 1863, Mr. Knickerbocker was born at Hopewell, N. Y. He attended school in Clifton Springs. He

served in the post office there some time before coming to New York as manager of the Garlock office. He was later transferred to the export department.

Surviving are his widow, a daughter, and two brothers. Funeral services were held on August 14. Interment was in Clifton Springs.

Prof. M. W. F. Treub

THE death at The Hague is announced of Prof. Melchior W. F. Treub, Dutch statesman and economist. Professor Treub, who was in his 72nd year, had always been much interested in the progress of the Netherlands East Indies and lately had taken an active part in the work of bringing together Dutch and British rubber interests to regulate supplies. He was for a number of years professor of economics at the University of Amsterdam and during the World War was Minister of Finance.

Hans Pahl

A PIONEER and highly esteemed figure in the German rubber industry has just passed away. On July 5, Hans Pahl, co-founder and director of the Pahl'sche Gummi- & Asbest-Gesellschaft m. b. H., Dusseldorf-Rath, died at the age of sixty. Born on May 18, 1871, in Dortmund, where his father had started the first rubber goods factory in the district, he received a thorough commercial training. In 1896 he together with his older brother Carl founded the present concern, which at the time had a capital of 110,000 marks, since then raised to 1,200,000 marks. The business is being continued by the sons of the founders, Heinrich and Hans Pahl.

Edwin J. Kroeger

EDWIN J. KROEGER, 50, construction engineer, The Goodyear Tire & Rubber Co., Akron, O., died on August 9, in Balboa, Panama Canal Zone, of a series of accidents. Mr. Kroeger fractured his ankle in a dive into the pool on shipboard between Buenos Aires and the Canal Zone, and he was sent to the Balboa hospital when infection set in. Death was due finally to pneumonia, which developed while he was in the hospital.

Mr. Kroeger was born in Akron and entered the employ of the B. F. Goodrich Co. after he left school. He was with that company for 27 years and left four years ago to join Goodyear. Two years ago he was sent to Argentina to supervise the construction of the plant at Hurlingham, near Buenos Aires.

In addition to his widow and children, Mr. Kroeger is survived by his mother, five brothers, and a sister.

James M. Stewart

James M. Stewart, production manager of the Pharis Tire & Rubber Co., died at his home in Columbus, O., on August 10. He was 55.

CANADA

According to German trade statistics Canada was seventh as a source of supply for rubber footwear imported by Germany in 1930, writes L. D. Wilgress, Canadian Trade Commissioner in Hamburg, in a recent issue of the *Commercial Intelligence Journal*. The imports from the Dominion totaled \$138,571, of which rubber-soled canvas shoes accounted for \$115,000 and rubbers for \$23,571. Imports of all rubber footwear into Germany last year totaled nearly \$4,000,000.

Because of the sales tax increase prices have been advanced slightly on friction tape.

Hockey puck prices have been named for fall booking, and salesmen are soliciting orders for later delivery.

June and the first part of July brought a heavy sale of garden hose because of the dry warm weather, but at this season of the year it is only natural to expect a slowing up of this commodity. A fair sale of garden hose, however, is being recorded, although the recent rains have lessened sales considerably. Hose occupies a prominent place in window and counter displays, and dealers anticipate continued demand until the fall season sets in.

Canadian Rockbestos Products, Ltd., a new company recently formed by the Eugene F. Phillips Electrical Works, Ltd., both of Montreal, P. Q., and the Rockbestos Products Corp., New Haven, Conn., U. S. A., will manufacture in Canada a complete line of asbestos, insulated wires, and cables, similar to those made by the New Haven company.

Northern Rubber Co., Ltd., Guelph, Ont. A fishing outing among the islands of Georgian Bay, north of Penetang, Ont., from which an exceedingly large catch of black bass was brought back, was attended by the following members of the firm: E. K. Reiner, president; R. C. Cooke, secretary-treasurer; F. W. Kramer, factory manager; Albert Reiner, director; W. E. Wing, sales manager, and E. A. Edmonds, Central Ontario salesman.

W. F. Bilger, director of publicity, Dominion Rubber Co., Ltd., Montreal, P. Q., has returned from a vacation on one of the palatial steamers plying between Montreal and Newfoundland.

Russell Mfg. Co., Middletown, Conn., U. S. A., and St. Johns, P. Q., maker of Rusco brake lining and other automotive products, in cooperation with the Champion Spark Plug Co., last month held a brake clinic at Sarnia, Ont., attended, in spite of a violent thunderstorm, by more than sixty automobile dealers and service station men. R. E. Prangley, Rusco manager at London, Ont., presided.

W. Milholm, representative of Leyland & Birmingham Rubber Co., Ltd. (James T. Goudie branch), Glasgow, Scotland, will soon visit Canada on his usual annual sales tour.

James Wootton, general manager, F. Longdon & Co. (Canada, Ltd.), Toronto, Ont., maker of knitted elastic goods and elastic equipment for all kinds of sports, is now making a combined business and pleasure trip to England.

Notice to Canadian Subscribers

The Canadian tariff on American magazines which is effective September 1, 1931, compels us to revise our rates. Hereafter the subscription price to Canada will be \$4.10 for a year and 40 cents a copy. All subscriptions now on our books will be fulfilled to their expiration at the old rates.

W. H. Miner, president of the Canadian Manufacturers' Association and of the Miner Rubber Co., Ltd., Granby, P. Q., entertained 250 employees of his firm on August 15 at his summer residence at Lake Bonalle, near Orford Mountain. Ten members of the Twenty-year Club, having served the company twenty years, were each presented with a \$500 check, an engraved gold watch, and a framed certificate by President Miner, Joseph Maton, treasurer of the Granby plant, and J. J. Macauley, secretary, of Montreal. The Twenty-Year Club was founded three years ago, and while there were ten presentations this year, there were seventeen last year and seven in 1929. The new members of this club are: Alex Carrie and James B. Sailes, of Montreal; Leon Guertin, Louis J. Cote, Alfred R. Heelis, Joseph H. Berger, Joseph Brunelle, Arthur Jarry, William A. Kimpton, and Mrs. D. Jubanville, all of Granby.

Canadian Goodrich Co., Ltd., Kitchener, Ont., in Canadian newspapers is featuring its Super-Cavalier, which it terms "The Thrift Tire of Canada."

Gutta Percha & Rubber, Ltd., Toronto, Ont., recently placed on the market two new sizes of force cups.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont. The Dunlop automobile tire used by the late Sir Henry Segrave at Daytona Beach in 1930, when he set a new world record for automobile speed at 231.16 miles per hour, now attracts much attention in tire shop windows in British Columbia. The tire is being passed from one Dunlop dealer to another throughout the entire province. The company in the newspapers, under the caption "Unbeaten Records," is telling Canada that in 1928 Captain Campbell relied on Dunlops to travel at 207 miles per hour; 1929, Sir Henry Segrave relied on Dunlops, enabling him to travel at 231 miles per hour, and 1931, Sir Malcolm (Captain) Campbell relied on Dunlops to create the phenomenal land speed record of 246 miles per hour in the most gruelling tire test ever made. Percy Alliss, famous British "pro" from Berlin, Germany, according to Dunlop, played a Dunlop golf ball throughout the entire tournament at Mississauga Golf Club, Toronto, when he came within one stroke of winning the 1931 Canadian Open Golf Championship.

MANY PRIDE THEMSELVES ON HAVING only satisfied customers, but this is not always an unmixed blessing. Satisfied customers may soothe, but unsatisfied ones stimulate greater achievement.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NUMBER	SPECIAL CIRCULARS
3056	Canadian tire exports, June, 1931.
3058	Crude rubber reexports from the United States, first six months, 1931.
3059	Imports of hard rubber combs and other hard rubber goods by countries and customs districts, first six months of 1931.
3060	Canadian tire exports, first half of 1931.
3061	Canadian footwear exports, first half of 1931.
3062	Canadian exports of belting and hose, first half of 1931.
3063	British exports of automobile tires and inner tubes, first quarter of 1931.
3064	French tire exports, May and June, 1931.
3065	French footwear exports, May and June, 1931.
3067	Competition in footwear increasing in Norway.
3068	German tire exports, first half of 1931.
3069	Belgian tire exports, May, 1931.

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

NUMBER	COMMODITY	CITY AND COUNTRY
*52,582	Bathing caps and other Prague, Czechoslovakia	
*52,602	Soles and heels.....	Leicester, England
*52,656	Acidproof aprons.....	Sao Paulo, Brazil
*52,658	Transmission belting.....	Paris, France
*52,659	Fire hose.....	Santiago, Chile
*52,664	Toys and balloons.....	Lisbon, Portugal
*52,665	Footwear.....	Berlin, Germany
*52,666	Belting.....	Bombay, India
*52,670	Surgical goods.....	Santiago, Chile
*52,682	Hot water bottles.....	Palmerston North, New Zealand
*52,684	Belting.....	Surabaya, Java
*52,685	Tires.....	Istanbul, Turkey
*52,691	Hose.....	Paris, France
*52,698	Surgical goods, toys, and balloons.....	Madras, India
*52,717	Soles and rubber thread.....	Habana, Cuba
*52,726	Advertising balloons.....	Dunedin, New Zealand
*52,738	Sport goods.....	Montreal, Canada
*52,746	Balloons and toys.....	Natal, Brazil
*52,770	Belting.....	Piraeus, Greece
*52,771	Footwear.....	Padua, Italy
*52,913	Tires.....	Guatemala City, Guatemala
*52,916	Sporting goods.....	Auckland, New Zealand
*52,986	Battery containers.....	Wellington, New Zealand
*53,022	Toys.....	Oslo, Norway
*53,023	Tires.....	Prague, Czechoslovakia
*53,024	Boots, overshoes, and surgical goods.....	Paris, France
*53,027	Athletic and sporting goods, reclaimed and hard rubber, and heels.....	Paris, France
*53,078	Toys.....	Prague, Czechoslovakia
*53,079	Technical goods.....	Prague, Czechoslovakia
*53,103	Bottles.....	Montreal, Canada
*53,104	Bath clothing, caps, gloves, and aprons.....	Sao Paulo, Brazil
*53,105	Galoshes and overshoes.....	Bucharest, Rumania
*53,108	Druggists' sundries, soles, and heels.....	San Jose, Costa Rica
*53,182	Dental and druggists' sundries, and plumbers' supplies.....	Toronto, Canada
*53,202	Rubber bands.....	San Juan, Porto Rico
*53,227	Hospital plasters.....	The Hague, Netherlands
*53,228	Sport goods.....	Berlin, Germany
*53,246	Tires, tubes, boots, etc.....	Dublin, Ireland
*53,280	Aprons, household gloves, bathing caps, bathing shoes, waterproof coats, bath mats, bath sponges, sanitary articles, etc.....	London, England
*53,281	Rubber goods.....	London, England
*53,282	Belting.....	Paris, France
*53,324	Fire hose.....	Camaguella, Honduras
*53,337	Motorcycle tires.....	Vienna, Austria
*53,338	Rubber chains.....	Vienna, Austria
*53,361	Balloons.....	Carlisle, England

*Purchase. †Agency. **Purchase and agency. ‡Either.

Rubber Industry in Europe

GREAT BRITAIN

Footwear Import Statistics

Rubber footwear import figures for the United Kingdom during 1929 and 1930 show that while rubber boots fell from 182,926 dozen pairs, value, £815,787, to 175,090 dozen pairs, value, £701,234, in 1930, rubber shoes, overshoes, and galoshes increased from 862,843 dozen pairs, value, £845,161, to 1,069,372 dozen pairs, value, £1,017,492. It is worth noting that whereas rubber boot imports from Canada and the United States, the chief sources of supply, considerably decreased over those for 1929, shipments from every other country (except France and Belgium) increased to a large extent. The boots from these foreign countries are of a cheap variety.

Of the foreign countries mentioned as supplying rubber boots to the United Kingdom in 1930, the greatest headway has been made by Czechoslovakia. In 1931, however, the interest centers on boots imported from Japan. During 1930 no rubber boots were imported from that country, but for the first four months of 1931 Japan is listed with 759 dozen pairs, value £499. These shoes are very low priced. Thus it seems ever-increasing shipments may be expected from Japan, with, of course, a consequent sharpening of competition.

The imports under the second head, rubber shoes, overshoes, and galoshes, as already stated, gained during 1930 in which all the countries of any importance participated except France. Canada ranked first according to value, but Belgium led in quantity. Germany is the third most important supplier. Czechoslovakia here too figured with a noteworthy increase in 1930, but again the shipments from Japan claim special attention. In 1929 arrivals from that country were not worth mentioning, but in 1930 they amounted to 8,058 dozen pairs, value, £4,360, and in the first four months of 1931, they came to 50,810 dozen pairs, value, £34,830, out of a total of 458,395 dozen pairs, value, £430,686.

Among the other suppliers were Canada, Czechoslovakia, Germany, and Belgium, exporting about the same quantity, though the value of the Canadian imports alone was almost as high as the imports of the other three countries together.

Rubber on the Farm

The difficult times through which rubber manufacturers are now passing incite them to greater effort so that all fields are more closely scanned to find possible outlets for rubber products. In a recent issue of the *India Rubber Journal* attention is called to the variety of rubber goods that exhibitors have displayed at agricultural shows as they are used on farms. An outstanding article is the milking machine now largely used on dairy farms. It has rubber tubing and suction devices. Other rubber articles used on the dairy farm are hose for washing down, rubber boots for

the staff, rubber parts for the bottle-washing plant, and rubber surgical supplies to combat disease among the cattle. For general farming are tubing and hose for spraying outfits; belting for threshing machines, hay elevators, etc.; a variety of other mechanical goods and accessories for sheep-shearing and horse clipping machines; and accessories for agricultural machinery. Besides are tires for trucks and automobiles, waterproof clothing and rubber-soled footwear, flooring and mats.

Black Inner Tubes

Two firms have now announced all black inner tubes, the British Goodrich Rubber Co., Ltd., which produces them in bus and truck sizes, and the India Tire Co., Inchinnan, Scotland, which at present markets them only in giant sizes, but expects to supply ordinary sizes later on. Superior qualities are claimed for these new tubes. The Goodrich tube is said to have a high heat resistance, increased tensile strength, reduced deterioration, as the tube ages, and much greater resistance to tearing.

The India All-Black Super Tubes are stated to be superior to the firm's blue tube. The black tube was submitted to a series of vigorous tests which it withstood successfully. It resisted inflation to 70 times its normal size, in which condition it was left for 24 hours without developing a leak. Then half a new good standard tube and half an India All-Black Super Tube were spliced together and run, heavily overloaded and under-inflated, for 100 miles at high speed. These conditions caused the temperature of the tube to rise to 243° F. When the test was over, the India All-Black part of the tube was found to be in perfect condition while the standard half was very soft and sticky and had thinned out over its entire area.

In a tearing test a black India tube was stretched to 5 times its original length; and although it was cut in 10 places, it still held. The aging test was equally successful. A tube was kept in an oven at the temperature of boiling water for 48 hours, after which it was found that the tube had lost only 25 per cent of its tensile strength.

Plastex

This plastic product with rubber base has been put on the market by Sir F. W. Royse & Co., Ltd., 20 Albert Square, Manchester. It is a very adhesive paste, easily applied to wood, iron, stone, concrete, brick, etc. When exposed to air, it forms a resilient rubber lining which has a chemical resistance equal to that of ebonite. The material has been used for lining storage tanks, bleaching troughs, process vessels, pipes, and the like. Articles for use in dyehouses, as buckets, piping, ladles, are also made of

Plastex with a core of expanded metal. The latest product is a brush Plastex for coating girders and similar constructional work to protect them from acid fumes.

"Story of Micronex"

A representative gathering of rubber technologists assembled at the First Avenue Hotel, London, England, July 16, on the invitation of Binney & Smith and Ashby, Ltd., to see a film illustrating the "Story of Micronex" and the various processes in preparation of carbon black as explained by W. B. Wiegand, Director of Research for Binney & Smith Co., New York, N. Y., U. S. A.

New Goods

Three standard types of sponge rubber flooring are being supplied by the Poppe Rubber & Tire Co.; No. 1 with solid top sheet and sponge rubber underneath; No. 2, a sponge sheeting to be used under carpets; and No. 3, which has a layer of strong canvas inserted between the top solid sheet and the sponge rubber backing.

The process of treating hair with latex for use in upholstery has so far been improved that the producer, Xetal Products, Ltd., Long Eaton, is reported to be putting the article on the market again. It was first produced about eight years ago, but at the time little interest was displayed in it. Now, however, the future of the article is considered promising.

It is learned that hosiery manufacturers are experimenting with elastic yarn to be inserted in the rib of socks for men and hosiery for women. The new circular rubber threads are being used to have the top of the hose grip the leg of the wearer in such a way as to make the use of garters unnecessary.

The Autorail, as the French motor train is called, is equipped with pneumatic tires, and is capable of running 75 miles per hour.

Company News

The India Rubber, Gutta-Percha & Telegraph Works Co.'s Burton works are to be closed down. Work and equipment will be transferred to Silvertown, where arrangements will be made by which sufficient space will become available to accommodate the Burton manufactures. The largest number of persons employed at Burton has been about 450, and the chief products include all classes of Palmer cord tires, golf balls, rims for automobiles, and wireless parts. The transfer is to be effected gradually and will take up some time; nevertheless the closing of the works will be a serious blow to Burton, which is already suffering because of serious unemployment.

The Flooring Development Syndicate, Ltd., Quadrant House, 55-58 Pall Mall,

London, S. W., registered as a private company, has been formed to acquire from C. J. Hewitt a license to use and exploit a process for the vulcanization of rubber, together with an option to buy the rights of the same process in the United States, in so far as it applies to manufacturing rubber floor coverings. The company has a nominal capital of £1,400 in £1 shares. Its directors are G. E. Duveen, of G. E. Duveen and Co., Ltd.; E. D. Money, of Boustead Bros.; H. Evans, general manager of St. Helens Cable & Rubber Co., Ltd.; and C. J. Hewitt.

David Moseley & Sons, Ltd., Chapel Field Works, Ardwick, Manchester, on July 17 suitably rewarded two more employees, now making the total twenty-five, who completed over fifty years of service with the firm. Oswald G. Moseley presented Richard O'Neil, cotton beamer, who joined the company in February, 1880, and Charles Yates, engineman, who joined in November, 1880, each with a gold watch and a substantial check.

Dr. Beyling, of Germany, at the International Safety in Mines Conference held at Buxton stated that he had used toy rubber balloons in experiments conducted in a disused mine in Gelsenkirchen, Ruhr Valley, to discover the factors causing ignition by fire-damp.

Unemployment in the British rubber industry on June 22, 1931, was 19.4 per cent against 19.3 per cent for the month before, 13.2 per cent a year ago, and 6.7 per cent two years ago. In the cable industry, unemployment slightly decreased over the May total, 15 against 15.3 per cent. A year ago unemployment in this branch was 8.1 per cent, and two years ago 4.6 per cent.

FRANCE

International Congress

The International Congress for the Development of Uses for Rubber will take place in Paris from September 29 to October 1, 1931, at the Cité des Informations of the Colonial Exhibition, under the chairmanship of M. Serruys, president of the Comité Economique Colonial (Colonial Economy Committee).

This congress, in the organization of which the Rubber Division of the Industrial Chemistry Congress has largely participated, will bring together producers, manufacturers, technologists, and consumers of rubber, and its activities will be followed by the official representatives of France and the foreign countries.

Persons wishing to present a paper at this congress are requested to address the Organization Committee, 49 Rue des Mathurins, Paris (8e), France.

Import and Export Statistics

During the first three months of 1931 French exports of tires and tubes totaled 23,625 quintals, value, 51,500,000 francs instead of 29,504 quintals, value 76,000,000 francs. The exports of tires and tubes for cycles at the same time dropped from 16,687,000 to 10,715,000 francs. France now

(Continued on page 97)

GERMANY

Cheap Goods in Demand

Since business conditions are poor and the purchasing power of the population is considerably lowered, the tendency is marked to buy only necessities and at prices as low as possible. With the insistence of low prices quality is being ignored; therefore dealers and manufacturers complain not only of underselling by competitors but of the sale of goods showing a progressive decline in quality. At the same time sales in certain types of goods are decreasing, irrespective of quality or price, where the public has to a large extent stopped buying them as being non-essential articles, or it has turned to others of different material but serving the same purpose. An item on the surgical goods industry, appearing in the *Gummi-Zeitung*, mentions a drop in sales of syringe fittings and states that the sales of hard rubber pessaries have fallen off because doctors prefer those of gold and silver, and aluminum by those who desire cheap ones.

The demand for cheap and still cheaper goods carries with it for certain articles a threat as dangerous as the change of style. For a point is eventually reached where it no longer pays the manufacturer to make such cheap goods, and moreover, it no longer pays the customer to buy them. The obvious remedy is to convince the customer that a better, though more expensive article, is cheaper in the long run and should, therefore, be purchased. But such propaganda is useless if the customer cannot afford the initial outlay and can find a substitute cheaper and more durable than the low grade rubber article.

Already manufacturers and dealers, taking candid stock of their position, are relinquishing lines which obviously do not pay them to manufacture or carry, leaving the field to others better equipped either in the same or a different branch. Manufacturers of hard rubber surgical goods which have been superseded by articles of other material are found to be taking up technical goods of hard rubber.

This sifting process seems to indicate that in many instances where rubber has come into use for articles also made of other materials and has been preferred because of external qualities, the cheap grade rubber article will, if economic conditions do not improve, eventually be eliminated in favor of those made of cotton, metal, leather, etc., which are at least as cheap, but while not presenting the same advantages as rubber, they are more durable.

Durability is a quality highly valued in Europe, more so than in America, and while for instance rubber syringe bags can be obtained as cheaply as the old-fashioned enamel container, and are compact, sanitary, and more attractive, yet the latter have continued in good demand because while the cheap rubber bag lasts about six months, the metal container will give years of good service. It is safe to say, therefore, that many who have been converted to the use of rubber containers will once more turn back to the old enamel can; and so it may be with many other articles in Europe if the depression continues.

Rubber Models

Attention is called to an interesting use of rubber as a model to illustrate the strain to which the welded seams in steam kettles are subjected. The special strains cannot be mathematically calculated and so a specially constructed rubber model of a steam kettle, with two kinds of bottoms, one ordinary and the other elliptically vaulted, with a longitudinal and a round seam has been used. By inflating the model the various strains on the walls can be judged by the degree of deformation. The ordinary bottom suffers the severest strain. The round seam causes considerable binding; while the longitudinal seam barely changes in lengthwise direction.

Company Notes

The Kolnische Gummiwaren-Fabrik, vorm. Ferd. Kohlstadt & Co., Koln-Deutz, in its annual report, summarizes in an interesting manner the price and the sales situation in 1930 as compared with 1929. At the end of 1929 the price of a kilo of Para rubber was 1.78 marks, and at the end of 1930, 1.17 marks. The price of a kilo of plantation rubber at the end of 1929 was 1.65 marks, and at the end of 1930, 0.91 marks. At the same time the price of one kilo of rubber thread was about 9 marks at the end of 1929, and 6 marks at the end of 1930. That is to say, the price of Para rubber fell about 34 per cent in 1930, and plantation rubber 45 per cent. The firm calculates that the proper reduction in the price for thread should not have been more than 8 per cent on the basis of the drop in the price of crude rubber, but it was actually 33 per cent lower although the costs for manufacturing were the same as in 1929.

Sales of rubber thread in 1930 showed a decline of about 20 per cent as compared with 1929, as to quantity, and of 38 per cent as to value, so that in the final analysis the decline in price for the total sales in 1930 comes to 23 per cent. The company booked a loss of 791,772 marks over the working of the year 1930.

C. Muller Gummiwarenfabrik, A. G., Berlin-Weissensee, reports net profits of 11,971 marks for the past business year. The works at present are fully occupied, and the sales have increased as compared with the year before. Prices, however, continue to be unfavorable, especially for surgical goods. The firm seems to be concentrating more and more on manufacturing sporting goods and bathing accessories, for which the outlook is considered excellent. In fact a new building has been added which doubles the floor space devoted to these goods. It is further learned that the company decided to buy back up to 300,000 marks worth of shares, hitherto in the hands of the banking firm Carseh & Co., at the rate of 60 per cent, while the current quotation on them is 63 per cent.

German imports of crude rubber during the first six months of 1931 were 233,029 quintals against 272,788 for the same period of the preceding year.

Rubber Industry in Far East

— NETHERLANDS EAST INDIES —

Tapping Data

It is well known that where tapping on an estate is so arranged that tappers have smaller tasks, the yield per unit of area is greater than when the tasks are large. This is because in small tasks the tapping can be done deeper and more carefully; while, furthermore, the smaller number of trees enables a coolie to finish tapping earlier when the flow of latex is greater, and, consequently, higher yields can be obtained.

Until quite recently reliable figures on the quantities of rubber harvested from tasks with varying numbers of trees have been hard to obtain. But such figures have now been made available by the experiments conducted by Harrisons & Crosfield, Ltd., on Bah Enda Estate, and by the Langkat Sumatra Rubber Co., Ltd., on Sinampoer Estate.

The results from both experiments show a satisfactory agreement and lead to the conclusion that between the limits of 250 and 380 trees per task, every increase or decrease of the tapping tasks by 7 trees is accompanied by a decrease or increase in yield of about 1 per cent. When, however, the tasks are increased or reduced over the entire estate, another factor comes into consideration which cannot be expressed in figures.

If the total number of tappers required is cut down, part of the labor force can be dispensed with. This condition permits selecting the best tappers so that the standard of tapping is raised over the whole estate. If, on the other hand, the tasks are reduced and more tappers are required, the standard of tapping, generally speaking, will suffer.

Consequently, it may be said that the above rule, giving the relation between the yield and the size of the tapping tasks, only holds good when the average quality of the tappers remains unchanged.

Tapping Hevea Buddings

In the *Archief voor de Rubbercultuur* of May, 1931, C. Heusser and H. J. V. S. Holder report the results of the new double cut tapping system on Hevea buddings in 1930. This is the third year of the experiment, the test having been started in 1928. The new system, two cuts over one-quarter of the circumference, was compared with the system of one cut over one-third the circumference. As in the two previous years, the results obtained with the double cut in 1930 were very much better than with the single cut; besides, the yield of the buddings tapped over one-third of the circumference during 1930 for no apparent reason was very disappointing.

For all clones tested, the dry rubber content of the output from the single cut over one-third was 3 to 4 per cent higher than for the double cut over one-fourth. In 1929 the difference had ranged from 2 to 5 per cent. brown bast disease occurred

to a greater extent where the double cut was adopted than with the single cut. In the former case the lower cut seemed to be more susceptible than the upper, so that the disease did not in every instance attack both cuts on the trees tapped with two cuts, but frequently only the lower one. The writers, therefore, remark that if the trees tapped with two cuts over one-fourth which had only one of the cuts attacked by brown bast are considered as *half* cases, there is practically no difference between the two systems as far as the incidence of brown bast is concerned, which is a curious thing to say.

After all, the crux of the situation as far as the susceptibility of the trees to disease is concerned, is just this, that more trees tapped with the double cut succumbed than did those tapped with a single cut, and it is rather obscuring the question, to say the least, to point out that the disease was noted on only one of the double cuts and not on both.

Finally, the report states that all buddings are more prone to develop brown bast than the seedlings with which they were compared.

The conclusion to be drawn from all this seems to be that the double cut tapping system on Hevea buddings does indeed give much larger yields than the single cut, but at the cost of a decline in the quality of the latex (lower rubber content) and an increase in the incidence of brown bast.

Thin Smoked Sheet

In the December, 1930, issue of the *Archief voor de Rubbercultuur*, Ir. van Harpen published an article on his method of preparing thin smoked sheet, stating the special advantages which he considered resulted therefrom. At the meeting of the German Rubber Association held at Eisenach in May of this year and again at the International Rubber Congress held in Paris in June, 1931, van Harpen read a paper on the same subject.

Now, an article written by J. van Baalen, manager of the Ned. Noorsche Plantage Mij. Bergen, examining the claims made by van Harpen, has been published in a recent issue of the *Bergcultures* and merits some attention.

Granting that, as van Harpen stated, making rubber sheets half the original thickness results in a saving of 75 per cent in the time required for drying and smoking, and that, consequently, some economies may be effected on buildings and fuel, van Baalen then discusses the probable increase in the cost of labor. Van Harpen admits the increase in the cost of labor, for in making thinner sheets more have to be rolled from a given amount of coagulum. But he considers that with the low rates paid to natives in the East, this additional cost is almost negligible.

Now, because of the special spiral pat-

tern used in printing the thin sheets, a reduction to half the thickness gives only 25 per cent more sheets. But that change means that the labor costs for the various operations required to turn latex into smoked sheet, to say nothing of the sorting of the sheets, the supervision and extra fuel and lubricant for operating the machinery a longer time, will be increased by 25 per cent. Since the costs of all these operations, on the basis of available data, work out at 2 cents per kilo of rubber at least, the extra cost, 25 per cent, adds ½-cent to the cost of a kilo of smoked sheet prepared according to the van Harpen method. Since van Harpen shows that the saving per kilo with his method is 0.35 cent, van Baalen comes to the obvious conclusion that van Harpen's method offers no advantage under usual circumstances and gives only a slight gain where unusually expensive smoke houses are necessary, where the fuel consumption is extraordinarily high, and where the fuel is particularly expensive, that is to say, only under abnormal conditions.

Company Results

As was to be expected, reports from the Dutch rubber planting companies are not particularly cheerful. A number of them have had to book losses; and even where profits have been made, these have for the most part been so low that dividends have had to be passed.

Thus the well-known Sumatra Rubber Cultuur Mij. Serbadjadi reports a loss for 1930 of about \$95,000 against a net profit of about \$65,000 the year before. The Waringen company had profits of only about \$3,300 against a profit of \$80,000; while the Indische rubber company made the same profit as the year before, about \$14,000. All of these companies omitted a dividend for the second time.

The Deli Batavia Rubber Co., one of the largest planting companies in the Dutch East Indies, lost roughly \$50,000 against a profit of about \$165,000 in 1929. The company was forced to resort to drastic measures of economy, and all further extensions have been stopped.

New Soling Adhesive

The discovery by an expert of the Osaka Industrial Research Institute of Japan, of an insoluble adhesive for attaching the rubber sole to canvas shoes, has just been announced. Previously wet weather caused the soles to separate from the uppers. But the new discovery apparently prevents this separation, and it is now predicted that by its aid, Japanese shoes will compete successfully with the English and the American canvas shoes in all the markets of the world.

MALAYA

Small Rubber Holdings

Much has been written and said about the small native holdings in the Netherlands East Indies, but comparatively little attention has been paid to the small holder in Malaya, although the output from this source is greater. A report on small rubber holdings in Malaya for the first quarter of 1931 has been published in the *Malayan Agricultural Journal* for May, 1931. The main difference between Malayan small holders and those in the Dutch East Indies seems to be that the former depend entirely upon rubber for their living, and, therefore, there is a greater tendency to tap excessively. Otherwise, in many respects, a report concerning Malayan small holders reads much like one from their Dutch East Indian confreres. We notice that the price obtained by the natives is often below the Singapore quotations, the determining factors being quality, distance from a central market, speculation among local small rubber dealers, and the amount of competition in the local buying center. As in Sumatra, the need of holiday cash frequently causes the small holder to sell at almost any price.

In many parts of the country small holders still plant rice and when this is ready for harvesting the rubber is left untapped. As in the Dutch colonies, the government authorities are urging the natives to devote themselves to raising food; consequently many of the areas have been planted to such crops. Although the Department of Agriculture regularly inspects native holdings, the general tendency is to neglect upkeep; and in those sections of the country where the people are entirely dependent on rubber, tapping is severe and excessive. In Johore, it is reported, trees in March were frequently tapped by lamplight before daybreak. In other districts, West Pahang and Singapore Island, for instance, a large percentage of the small holdings are untapped.

As to disease, moldy rot is very prevalent during the wet season, and the infection is conveyed to new centers by tappers dismissed from infected localities. While severe outbreaks of mildew were reported in Negri Sembilan and Malacca after the wintering season in 1930, the attacks this year have been mild.

It is interesting to note that some Chinese and Malay owners of small holdings have been inquiring regarding supplies of budwood and methods of budding.

Rubber Bound Paint

Last month mention was made of local inventions relating to the use of latex for surfacing roads, and now attention is called to another invention, a rubber bound paint, from which much is expected. The inventor is L. Cresson, chemist and technical manager of the Singapore Rubber Works, Ltd., who already has several patents covering the use of rubber for various purposes to his credit, who is better known as the inventor of the Cresson paving block.

The newest product has already been tried on a small scale and has proved satis-

factory, but now it is to be tried on the front of the government offices; while for the sake of comparison the back and the side will be treated with the usual color wash.

The cost of the new paint is about one-quarter that of ordinary oil paint and about half that of high-grade distemper. It gives a smooth surface that may be dull or glossy, as desired, and comes in a variety of shades and colorings, and also in a semi-transparent form that can be used as preservative. A striking feature of the product is that it is unaffected by new plaster and concrete, on which it dries rapidly. Dampness does not cause it to peel; in fact, it helps to keep dampness out. It has high abrasive qualities, particularly the special grade for painting floors, and offers the advantage of being easy to clean.

The paint is easy to apply and is supplied in concentrates easily diluted with cold water, and dries very rapidly.

The rubber content of the general type of paint for interior and exterior decorative work is approximately 5 pounds per 1,000 square feet per coat of paint, but two coats are more satisfactory. Of course, the percentage of rubber differs according to the grade; thus the special paint for acoustic purposes contains 18 pounds of rubber per 1,000 square feet per coat of paint, and here it is necessary to apply about four coats.

Cressonite Tiles

While on the subject of the Singapore Rubber Works' products, mention may be made of Cressonite tiles which are becoming popular in Malaya. Attractive floorings have been produced locally by this firm. The barber shop at the Singapore Cricket Club has a smart looking floor of large tiles in two contrasting colors supplied by the concern. More ambitious designs have been produced for use in the home, larger tiles in marbled effects being used in combination with smaller tiles in contrasting colors on a plain color background offset by a narrow dark border.

No Reduction in Native Output

In connection with the above, it is worth while noting what the Eastern Rubber Agency, London agents for E. A. Barbour, Singapore, have to say with regard to the output from Malay small holdings.

As long as rubber is salable there will be little or no falling off in the output from this source. The majority of the Malays will not attempt rice plantings, as the work is arduous and the price low. At present prices, \$1.60 (Straits currency) per month will provide the rice for a family of three or four, and indications are that as a result of the vigorous fostering of over-production by the various governments, the price of rice will fall still lower.

Where a family is unable to do all the tapping on an acreage, part is let out on the *bagi dua* system, that is, the contractors and the owners share the proceeds somewhat as in the Dutch East Indies. Blocks

of 20 acres and over are contracted out, some for three years ahead, the terms being that tapping shall continue as long as rubber is salable, but that piece rate at estate rates is to be paid when the price exceeds \$20 per picul. In one case a man has 106 acres, and his contractor 18 coolies. The output is 35 piculs per month, and after such expenses as acid, fuel and transport are paid, the contractor's share averages \$150 per month. If the price drops one-half, the contractor will still draw \$75, which will be more than enough to feed the coolies. There are plenty of contractors to be had, and since there is no other work, tapping will continue as long as rubber can be sold.

CEYLON

Effect of Storage on Rubber

The cause of the variability in the plasticity of plantation rubber after storage has been studied by G. Martin and L. E. Elliott, of the Scientific Staff in London of the Ceylon Rubber Research Scheme.

As raw rubber is subjected to a wide range of temperatures and humidity conditions before use by the manufacturer, a detailed investigation is being conducted at the Imperial Institute on the effect of different conditions of storage.

The results of preliminary tests showed that rubber becomes slightly harder at 15° C. than at 0° C., and that it hardens more quickly in a dry than in a damp atmosphere.

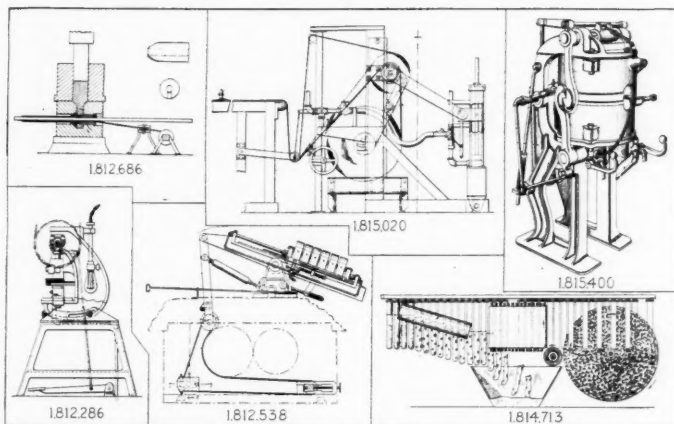
Further experiments have now been made with crepe and sheet stored for six months at 0° C., 15° C., 30° C., and 45° C. Some of the samples were kept in glass tubes containing dry nitrogen, and others in tubes containing dry oxygen. Some of the samples of sheet were treated with dilute ammonia solution to remove antioxidants; another portion was treated with water, and a third with tannic acid, this acid being regarded as a possible antioxidant.

The results indicate that the two fundamental factors responsible for the changes in the plasticity of stored rubber are: a spontaneous hardening which occurs in nitrogen and, therefore, probably in any inert atmosphere; and a softening induced by oxygen. These changes occur simultaneously when oxygen is present; at low temperatures hardening exceeds softening, and at high temperatures softening exceeds hardening; the critical point seems to be about 30° C.

Ammonia extracted rubber became very soft in oxygen at 45° C., but hardened at 15° C.; when not treated with ammonia, the rubber hardened even at 45° C. The removal of the antioxidants seems to affect the aging qualities of raw rubber as well as of vulcanized rubber.

The water extracted rubber did not soften to the same extent as rubber treated with ammonia. Tannic acid appeared to have no marked antioxidant effect. The results obtained explain the differences between the effect of storage in the tropics and in Europe.

Patents, Trade Marks, Designs



Machinery

United States

- 1,812,286.* **Rubber Seaming Machine.** This device is adapted to trim away the ribbon of rubber flush with the edges of a bathing cap and at the same time effect an increase of the weld or adhesive union between the end portions of the reinforcing rubber ribbon and the underlying seamed portion of the cap. A. E. Collins, Cuyahoga Falls, O., assignor, by mesne assignments, to Miller Rubber Co., Inc., Wilmington, Del.
- 1,812,538.* **Rubber Mill.** A mechanism operates the endless apron used to feed compounding materials to form a composition with rubber on a two-roll mixing mill. The device is designed to maintain the apron support truly parallel with the mill roll and thus facilitate good mixing. W. H. Lockert and P. E. Welton, Cuyahoga Falls, O., Lockert assignor to Welton.
- 1,812,686.* **Rubber Cord Marker.** Permanent marking of a rubber cord or insulated cable is secured without distortion of the insulation by positioning a lead marking ribbon in a groove provided in the male die of a lead press. The marking ribbon, therefore, is not impressed into the rubber insulation. G. J. Crowdes, Dorchester, assignor to Simplex Wire & Cable Co., Boston, both in Mass.
- 1,814,712 and 1,814,713.* **Stripping Machine.** Dipped articles, such as finger cots, balloons, etc., are stripped continuously from their forms after vulcanization by passage against the faces of suitably positioned brushes. The removal of the article begins as the form is rotated against an inclined brush and is completed by a second brush positioned in a horizontal plane. Y. H. Kurkjian, Hawthorne, N. J., assignor to Carl J. Schmid, Inc., New York, N. Y.
- 1,815,020.* **Separating Sheets.** A rubberized fabric is separated from its liner by applying to them a series of intermittent pulls as they pass an idler

roll. When thus separated, the liner is wound up on a shell while the rubberized fabric is fed over this liner wind-up roll to a bias cutter. H. S. Alexander and F. B. Pfeiffer, Akron, and J. W. White, Barberton, both in O., assignors to Seiberling Rubber Co., a corporation of Del.

- 1,815,400.* **Ball Mold Press.** This is a unit mold press for inflated balls. It has hinged platens with simplified power mechanism for opening and closing a single large ball mold. It also has a novel means for locking the mold in closed position. B. De Mattia, Passaic, N. J.
- 1,812,282. **Vulcanizer.** E. Blaker, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,812,792. **Vulcanizer.** K. B. Kilborn, Fairlawn, O., assignor to Seiberling Rubber Co., a corporation of Del.
- 1,812,821. **Inner Tube Vulcanizing Mold.** P. De Mattia, Passaic, N. J., assignor to National Rubber Machinery Co., a corporation of O.
- 1,813,150. **Molding Die.** E. W. Dunbar, Hudson, assignor to Cambridge Rubber Co., Cambridge, both in Mass.
- 1,813,215. **Tube Tester.** H. E. Warner, W. Springfield, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.
- 1,813,246. **Tube Cutter.** G. J. Mead, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.
- 1,813,264. **Tire Builder.** G. F. Wickle, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.
- 1,813,587. **Design Applier.** J. J. Sindler, assignor to Hodgman Rubber Co., both of Framingham, Mass.
- 1,813,797. **Rubber-Handled Tool Mold.** W. V. Foley, New Haven, assignor of one-half to E. S. Beach, Ridgefield, both in Conn.
- 1,813,869. **Flap Cutter.** E. G. Templeton and W. K. Glennon, assignors to Goodyear Tire & Rubber Co., all of Akron, O.
- 1,813,871. **Condenser.** K. B. Ayers, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,813,876. **Cord Belt Builder.** W. H. Gerstenslager, assignor to Goodyear

- Tire & Rubber Co., both of Akron, O.
- 1,813,878. **Flap Branding Machine.** R. M. Johnson, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,813,880. **Tire Mold Making Device.** H. T. Kraft, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,814,197. **Sponge Rubber Cutter.** W. Vernet, assignor to Rubbersan Products, Inc., both of New York, N. Y.
- 1,814,276. **Skeleton Structure Mold.** J. Anoskopay, Providence, R. I.
- 1,814,731. **Cushion Tire Apparatus.** E. and G. Nelson, both of Belleville, N. J., assignors to Overman Cushion Tire Co., Inc., New York, N. Y.
- 1,815,085. **Tire Vulcanizer.** H. Willshaw, T. Norcross, and F. G. Broadbent, all of Erdington, England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.
- 1,815,359. **Collapsible Tire Building Core.** F. D. Mason, assignor to Bridgewater Machine Co., both of Akron, O.
- 1,815,764. **Tire Spreader.** J. A. Edelmann, Union, N. J.

Dominion of Canada

- 313,061. **Mold Cleaning Solution.** Goodyear Tire & Rubber Co., assignee of R. C. Bateman, both of Akron, O., U. S. A.
- 313,063. **Condenser.** Goodyear Tire & Rubber Co., assignee of K. B. Ayers, both of Akron, O., U. S. A.

United Kingdom

- 345,444. **Mold Opening Device.** Dunlop Rubber Co., Ltd., London, and H. Willshaw, Fort Dunlop, Birmingham.
- 346,380. **Inner Tube Mold.** Firestone Tyre & Rubber Co., Ltd. (formerly Firestone Tyre & Rubber Co. (1922), Ltd.), Middlesex. (Firestone Tyre & Rubber Co., Akron, O., U. S. A.)
- 346,704. **Cable Impregnating Device.** H. Sonnenfeld, Pressburg, Czechoslovakia.
- 346,857. **Tire Mold.** Dunlop Rubber Co., Ltd., London, H. Willshaw and T. Norcross, both of Fort Dunlop, Birmingham.
- 346,954. **Molding and Vulcanizing Rubber.** E. S. Long, London.
- 347,702. **Hollow Ball Mold.** J. A. Law, Ascot Vale, Australia.
- 347,881. **Thread Feed Regulator.** E. Sallis, Basford, Nottingham.
- 347,939. **Molding Footwear.** H. A. and G. Steppe, all of Brussels, Belgium.
- 348,181. **Forming Beadings on Hollow Articles.** C. J. Schmid, Inc., New York, N. Y., U. S. A.

Germany

- 529,548. **Tube Press Tool.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnorn and E. Noll, both of Berlin S. W. 11.
- 529,763. **Tire Repair Device.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth,

*Pictured in group illustration.

C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin S. W. 11.

Designs

- 1,175,781. **Block Belt Vulcanizer.** Franz Clouth Rheinische Gummiwarenfabrik A.G., Köln-Nippes, and Isbeg Industrie & Schiffsbedarf G. m. b. H., Berlin W. 9.
1,175,972. **Vulcanizing Apparatus.** J. Wittemann, Mainz.
1,177,122. **Device for Dipping Tubes.** O. Beel, Wahn i. Rhld.
1,177,274. **Testing Air-Tightness.** Firma Louis Schopper, Leipzig, S. 3.
1,177,411. **Hardness Tester.** Firma Louis Schopper, Leipzig, S. 3.

Process

United States

- 1,813,176. **Tire Bead Construction.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
1,813,235. **Molded Article Manufacture.** E. W. Dunbar, Hudson, assignor to Cambridge Rubber Co., Cambridge, both in Mass.
1,813,440. **Rubber Coated Article.** B. Dales, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
1,814,132. **Preparing Adhesive Tape.** R. G. Drew, assignor to Minnesota Mining & Mfg. Co., both of St. Paul, Minn.
1,815,057. **Homogeneous Rubber Deposits from Latex.** F. Gabor and P. Klein, both of Budapest, Hungary, and A. Szegvari, Akron, O., assignors, by mesne assignments, to American Anode, Inc., a corporation of Del.
1,815,558. **Floor Covering.** J. R. Gam-meter, Akron, O.
1,815,586. **Treating Pile Fabric.** J. B. Robertson, Paterson, and G. Robertson, Ridgewood, assignors to Paratex Corp., Paterson, all in N. J.

Dominion of Canada

- 313,246. **Treating Artificial Leather Sheeting.** Brown Co., assignee of R. B. Hill, both of Berlin, N. H., and J. A. Fogarty, Portland, Me., co-inventors, both in the U. S. A.
313,350. **Paper Manufacture.** J. H. Watson and H. E. Anderson, co-inventors, both of Linwood, Scotland.

United Kingdom

- 346,789. **Vulcanizing Electric Cables.** Standard Telephones & Cables, Ltd., London. (J. R. Pheazey, Tokyo, Japan.)
347,075. **Forming Driving Belts.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.
347,691. **Rubberized Fabric.** J. T. Shevlin, London. (Soc. Italiana Pirelli, Milan, Italy.)
348,101. **Goods from Rubber Dispersions.** Anode Rubber Co., Ltd., Guernsey, assignees of S. E. Sheppard, Rochester, N. Y., and C. L. Beal, Akron, O., both in U. S. A.
348,169. **Ornamenting Rubberized Fabric.** F. Thompson, Manchester.
349,141. **Coated Fabrics.** Mechanical Rubber Co., Cleveland, O., assignees of B. H. Foster, Maplewood, N. J., and K. B. Cook, Providence, R. I., all in U. S. A.

Germany

- 528,614. **Hard Rubber Design.** New York-Hamburger Gummiwaaren Co., Hamburg.
529,902. **Molded Articles.** H. Buchholz, Berlin-Neukölln.
529,955. **Elastic Stamps.** T. Kaiser, Stempelfabrik, Berlin S.W. 68.
530,245. **Hard Rubber Lined Articles.** H. F. W. Menzel, Berlin-Hermsdorf.

Chemical

United States

- 1,811,925. **Composition.** R. E. Garrett, Lancaster, assignor to Armstrong Cork Co., Pittsburgh, both in Pa.
1,812,285. **Golf Ball.** J. A. Christie, Akron, O.
1,812,639. **Synthetic Resin Compound.** C. G. Moore, Lakewood, and M. Zucker, assignors to Glidden Co., both of Cleveland, all in O.
1,813,609. **Age Resister.** A. M. Clifford, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
1,814,286, 1,814,287, and 1,814,288. **Vulcanizing Controlling Material, etc.** S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.
1,814,420. **Synthetic Rubber.** H. Tochtermann, Mannheim, and C. Heuck, Ludwigshafen a. Rhine, assignors to I. G. Farbenindustrie A.G., Frankfurt a. M., all in Germany.
1,814,473. **Forming Rubber Casts.** E. A. Hauser, Frankfurt a. M., Germany, and R. H. Watts, Herne Bay, England, assignors to Dewey & Almy Co., Cambridge, Mass.
1,815,072. **Age Resister.** M. C. Reed, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.
1,815,778. **Rubber Composition.** A. M. Kinney, Chicago, Ill., assignor to Standard Oil Co., Whiting, Ind.

Dominion of Canada

- 312,800. **Rubber Reclaiming Process.** Dispersions Process, Inc., Dover, Del., assignee of A. E. Barnard, Norristown, Pa., both in the U. S. A.
312,977. **Chewing Gum.** J. H. Quine, Rochester, N. Y., U. S. A.
313,060. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.
313,240. **Electrical Insulation.** Binney & Smith Co., New York, N. Y., assignee of W. B. Wiegand, Sound Beach, Conn., both in the U. S. A.
313,247. **Road Paving Composition.** Canadian Amiesite, Ltd., Montreal, P. Q., assignee of S. S. Sadtler, Springfield Township, Pa., U. S. A.
313,450. **Electrical Insulation.** Binney & Smith Co., New York, N. Y., assignee of W. B. Wiegand, Sound Beach, Conn., both in the U. S. A.
313,523. **Rubber Varnish.** Radiochemisches Forschungs-Institut. G.m.b.H., assignee of H. Plauson, both of Darmstadt, Germany.

United Kingdom

- 345,175. **Rubber Composition.** J. Baer, Basle, Switzerland.
345,335. **Vulcanization.** J. E. Pollak, London. (W. B. Wiegand, New York, N. Y., U. S. A.)

- 345,699 and 345,700. **Rubber Compositions.** N. Kenyon, Sheffield, and Spen Rubber Works, Ltd., Heckmondwike.
346,290. **Devulcanizing Rubber.** O. G. Bohlin, Helsingborg, Sweden.
346,489. **Non-Adhesive Rubber Dust.** Goodyear Tire & Rubber Co., assignee of P. A. Davis, both of Akron, O., U. S. A.
346,673. **Treating Latex.** Anode Rubber Co., Ltd., Guernsey, assignee of C. L. Beal, Cuyahoga Falls, O., U. S. A.
346,680. **Rubber Compositions.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfurt a. M., Germany.)
346,810. **Microporous Rubber.** Dunlop Rubber Co., Ltd., London, and E. W. Madge, Fort Dunlop, Birmingham.
346,894. **Cold Vulcanization.** F. W. Farr, Northampton.
347,108. **Synthetic Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfurt a. M., Germany.)
347,278. **Brake Lining Composition.** Raybestos-Manhattan, Inc., Passaic, N. J., assignee of H. Abert, New York, N. Y., and A. Whitelaw, Passaic, N. J., all in the U. S. A.
347,376. **Chewing Gum Composition.** W. W. Triggs, London. (Sweets Laboratories, Inc., New York, N. Y., U. S. A.)
347,478. **Vulcanizing Method.** B. E. Marean, of British Moulded Hose Co., Ltd., Watford, Hertfordshire.
347,735. **Latex Gas Cell Composition.** Goodyear Tire & Rubber Co., Akron, assignee of C. M. Carson, Cuyahoga Falls, both in O., U. S. A.
347,802. **Synthetic Rubber.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfurt a. M., Germany.)
347,826. **Coated Fabrics.** W. W. Triggs, London. (E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.)
347,849. **Rubber Compositions.** J. Y. Johnson, London. (I. G. Farbenindustrie A.G., Frankfurt a. M., Germany.)
347,916. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of A. M. Clifford, both of Akron, O., U. S. A.
347,955. **Accelerator.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of S. M. Cadwell, Leonia, N. J., both in the U. S. A.
348,077. **Synthetic Rubber Compositions.** I. G. Farbenindustrie A.G., Frankfurt a. M., Germany.
348,147. **Pigment Dispersion.** Goodyear Tire & Rubber Co., Akron, assignee of C. R. Park, Cuyahoga Falls, both in O., U. S. A.
348,192. **Rubber-Gutta Percha Compositions.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.
348,600. **Compound Sheet Material.** L. Rado, Berlin, Germany.
349,102. **Molded Fibrous Packings.** Compagnie Generale D'Electricite, Paris, France.

Germany

- 528,758. **Combining Microporous Rubber.** Metallgesellschaft A.G., Frankfurt a. M.
529,054. **Rubber Mixings.** Barrett Co., New York, N. Y., U. S. A. Represented by S. Hamburger, Berlin S. W. 61.

- 530,163. **Rubberlike Bodies.** J. Baer, Basle, Switzerland. Represented by G. Winterfeld, Berlin S. W. 68.
- 530,434. **Preserving Latex.** I. G. Farbenindustrie A.G., Frankfurt a. M.
- 530,669. **Rubberlike Substances.** Anode Rubber Co., Ltd., Guernsey, England. Represented by S. Goldberg, Berlin S. W. 61.

General United States

- 1,811,944. **Tube Securing Means.** F. W. Krone, San Francisco, Calif.
- 1,812,113. **Refrigerating Apparatus.** O. F. Nelson, Grosse Pointe, Mich., assignor to Copeland Products, Inc., a corporation of Mich.
- 1,812,229. **Non-Leaking Fountain Pen.** R. H. Whitehead, assignor of one-tenth to C. S. Merrill, both of Salt Lake City, Utah.
- 1,812,279. **Elastic.** E. S. Axline, New York, N. Y., assignor to Associated Apparel Industries, Inc., Chicago, Ill.
- 1,812,287. **Conveyer.** G. C. Davis, Dallas, Tex., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,812,354. **Rope.** H. G. Metcalf, assignor to Columbian Rope Co., both of Auburn, N. Y.
- 1,812,514. **Printing Machine.** K. Christian, Bad Soden on Taunus, Germany.
- 1,812,610. **Tire Valve Cap.** W. R. Royer, Wyoming, Pa.
- 1,812,891. **Exercising Belt.** F. X. Meehan, assignor of one half to A. D. Luehrmann, both of St. Louis, Mo.
- 1,812,963. **Channeled Strip Material.** E. J. Kvet, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,813,027. **Packing Inner Tubes.** J. Cooper, Inchinnan, Scotland.
- 1,813,249. **Tire Gate.** M. E. Mitchell and A. F. Swan, both of Oakland, Calif.
- 1,813,501. **Desk Pad.** M. S. Lower, assignor to Sun Rubber Co., both of Barberton, O.
- 1,813,561. **Ballet Slipper.** S. Capezio, E. Paterson, N. J.
- 1,813,603. **Cushion Tire.** R. Bello, New York, N. Y.
- 1,813,698. **Endless V-Shaped Belt.** C. C. Gates, assignor to Gates Rubber Co., both of Denver, Colo.
- 1,813,706. **Truck Resilient Unit.** G. Q. Lewis, Wheaton, assignor to W. H. Miner, Inc., Chicago, both in Ill.
- 1,813,758. **Pneumatic Tire.** C. Paridy, Belleville, Ill.
- 1,813,824. **Central Buffing and Draw Gear.** A. Spencer and R. T. Glasco-dine, both of London, England.
- 1,814,055. **Toy and Securing Means.** M. J. Napier, Akron, O.
- 1,814,057. **Sweatband.** S. J. Palinkos, Norwalk, Conn.
- 1,814,139. **Constructional Material.** A. C. Fischer, Chicago, Ill., assignor to Philip Carey Mfg. Co., a corp. of O.
- 1,814,340. **Tire.** I. J. Shelton, Detroit, and C. V. Jacobi, Grosse Pointe Farms, both in Mich.
- 1,814,373. **Powder Pad and Casing.** C. P. Evans, New York, N. Y.
- 1,814,429. **Hot Water Bottle.** C. H. Borst, Cuyahoga Falls, O.
- 1,814,623. **Rubber-Tired Wheel.** W. S. Fennell, Elkhart, Ind.
- 1,814,634. **Elastic Wheel.** T. Sanmarti, Sabadell, Spain.
- 1,815,044. **Insulator.** J. D. Beebe, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,815,267. **Garter.** J. H. Mackall, Akron, O.
- 1,815,435. **Traction Tread.** R. W. Harding, Sedgwick, Me., and J. J. Richards, Brookline, Mass.
- 1,815,442. **Vehicle Engine Shock Absorber.** A. F. Masury, assignor to International Motor Co., both of New York, N. Y.
- 1,815,507. **Tire.** L. Härter, Berlin-Wannsee, Germany.
- 1,815,533. **Tire Chuck.** J. A. Vincent, Providence, R. I.
- 1,815,560. **Massage Instrument.** A. Gehm, Pittsburgh, Pa.
- 1,815,596. **Door Antirattling Device.** L. Stark, Brooklyn, assignor to Kaster Specialty Mfg. Co., Inc., New York, both in N. Y.
- 1,815,624. **Cuff Link.** J. D. Keillor, Aylmer, Ontario, Canada.
- 1,815,806. **Pressure Switch.** A. C. Smith, assignor of one half to L. T. Everett, both of Alleyton, Tex.
- 1,815,879. **Fabric Belting.** F. W. Alexander, assignor of half share to Lewis & Taylor, Ltd., both of Cardiff, Wales.

Dominion of Canada

- 312,702. **Central Buffing and Draw Gear.** R. T. Glasco-dine, London, S.W.1.
- 312,746. **Desk Pad.** W. F. Sanders, Chicago, Ill., U. S. A.
- 312,865. **Insulated Electrical Conductor.** Edward P. Stahel & Co., Inc., New York, assignee of H. T. Smethurst, Forest Hills, L. I., both in N. Y., U. S. A.
- 312,956. **Ink Bottle Device.** R. S. Green, Toronto, Ont.
- 313,062. **Steering Wheel Cover.** Good-year Tire & Rubber Co., assignee of E. D. George, both of Akron, O., U. S. A.
- 313,200. **Textile Machinery Roller.** H. McGhee, Rushcutters Bay, N. S. W., Australia.
- 313,205. **Permanent Hair Waving Unit.** M. D. Provost, Salt Lake City, Utah, U. S. A.
- 313,290. **Reenforced Hose.** New York Rubber Corp., New York, assignee of J. E. Davis, Beacon, both in N. Y., U. S. A.
- 313,354. **Nipple.** R. G. A. Beck, Montreal, P. Q.
- 313,358. **Swimmers' Foot Appliance.** N. A. Chastenay, Ozone Park, N. Y., U. S. A.
- 313,362. **Tire Stem Base Connector.** J. C. Crowley, Cleveland Heights, O., U. S. A.
- 313,363. **Valve Stem and Adapter.** J. C. Crowley, Cleveland Heights, O., U. S. A.
- 313,364. **Valve Mechanism.** J. C. Crowley, Cleveland Heights, O., U. S. A.
- 313,369. **Fountain Pen Lever Filler.** E. C. Franzmann, W. Somerville, Mass., U. S. A.
- 313,416. **Vaginal Syringe.** E. Spardel, Hamburg, Germany.
- 313,482. **Door Check.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of I. W. Robertson, Akron, O., U. S. A.

- 313,562. **Golf Club.** Wilson-Western Sporting Goods Co., Chicago, assignee of C. G. Jansky, Berwyn, both in Ill., U. S. A.

United Kingdom

- 346,724. **Connecting Uppers to Insoles.** M. Soubies, Caudean, France.
- 346,769. **Machinery Shock Absorbers.** Akt.-Ges. Brown, Boveri & Cie, Baden, Switzerland.
- 346,961. **Shaving Brush.** J. H. Morgan, London.
- 347,064. **Windscreen Heater.** E. J. Gallagher, Baltimore, Md., U. S. A.
- 347,081. **Surgical Irrigator.** E. Spardel, Hamburg, Germany.
- 347,215. **Pads.** F. I. Eyre, Lancashire.
- 347,283. **Heel.** P. Koehler, Helsingborg, Sweden.
- 347,336. **Bathing Cap.** Leyland & Birmingham Rubber Co., Ltd., Leyland, and R. W. Lunn, Preston.
- 347,393. **Horseshoes.** C. Mezieres, Rocquigney, France.
- 347,342. **Pipe Coupling.** J. Lilly, Birmingham.
- 347,436. **Countersunk Tips.** A. F. Jordan, Bristol.
- 347,502. **Golf Club.** J. G. Gill, Aisthorpe, Inverness.
- 347,504. **Electrocuting Fish.** A. and K. J. Sæbjörnsen, both of Haroy, Norway.
- 347,545. **Toy Caterpillar Tractor.** Bing Werke, Vorm. Geb. Bing Akt.-Ges., Nuremberg, Germany.
- 347,581. **Golf Bag.** F. J. Leather, London.
- 347,690. **Pneumatic Tire.** Dunlop Rubber Co., Ltd., London, and F. Fellows, Fort Dunlop, Birmingham.
- 347,805. **Toy.** Capon, Heaton & Co., Ltd., A. V. Wigley, and S. A. Chapman, all of Birmingham.
- 347,820. **Mudguards.** C. C. Whitling and G. Harvey, both of London.
- 347,842. **Massage Treatment.** S. E. Francis, London.
- 347,953. **Missile for Games.** W. M. Rowe, Warsash.
- 348,070. **Cartons.** Lissen, Ltd., and J. E. Clark, both of Middlesex.
- 348,073. **Turnshoe.** J. Kellner and D. Schreiber (trading as Kellner & Schreiber), all of Vienna, Austria.
- 348,193. **Pneumatic Tire.** J. G. Yepes, Madrid, Spain.
- 348,239. **Suspenders.** J. Laurain, Paris, France.
- 348,261. **Gas Mask.** H. E. Potts, Liverpool. (Chemischen Fabrik Dr. H. Stoltzenberg, Hamburg, Germany.)
- 348,327. **Flexible Unjointed Hinges.** H. N. Wylie, Twickenham, Middlesex.
- 348,387. **Tubular Fabrics for Boots.** P. Wangemann, Berlin, Germany.
- 349,441. **Sifting Apparatus.** G. H. Schieferstein, Berlin, Germany.

Germany

- 528,555. **Heel Cover.** E. Stegemann, Leipzig-Anger.
- 529,106. **Cushioning Sole.** A. Schaffer, Veliki-Beckerek, Yugoslavia. Represented by S. Hamburger, Berlin S. W. 61.
- 529,151. **Bandage.** W. Hirsch and W. Schonberger, both of Frankfurt a. M.
- 529,448. **Plate Spring Protection.** F. Gorschinski, Leipzig, C. I.

- 529,453. **Inner Sole.** Friedrich Wilop Gummiwerke Schönebeck, Hamburg.
 529,940. **Inner Tube.** K. W. Hess, Mannheim C. 4.
 530,023. **Rubber Antiskid Chain.** E. E. Adam, Zittau.
 530,453. **Shoe.** Radium Gummiwerke m. b. H., Köln-Dellbrück.
 530,597. **Driving Belt.** Continental Gummiwerke A.G., Hannover.

Designs

- 1,173,132. **Heel.** B. Weight, Heidenau.
 1,173,154. **Cable.** Carl Reinshagen Telefonschuer-Kabel-und Gummiwerke G. m. b. H., Wuppertal-Ronsdorf.
 1,173,184 and 1,173,185. **Tire.** Continental Gummiwerke A. G., Hannover.
 1,173,202. **Apron.** Firma Carl Plaat, Köln-Nippes.
 1,173,306. **Soles and Heels.** G. Grefkes, Viersen.
 1,173,312. **Sponge Rubber Ink Wiper.** A. Epstein, Berlin-Wilmersdorf.
 1,173,625. **Heel.** O. Schlappig, Düsseldorf.
 1,173,814. **Wrist Watch Protector.** F. Pinseler, Magdeburg.
 1,173,829. **Sponge Rubber Powder Puff.** I. & H. Lieberg, Kassel.
 1,173,861. **Movable Figure.** J. Fiege, Düsseldorf.
 1,174,063. **Wallet.** W. Lipsky, Hamburg.
 1,174,086. **Cap for Gum Container.** Firma Günther Wagner, Hannover.
 1,174,132. **Pouch.** Harburger Gummiwaren-Fabrik Phoenix A. G., Harburg-Wilhelmsburg.
 1,174,136. **Knitted Elastic Knee Cap.** O. Fankhanel, Triebes, Thuringia.
 1,174,246. **Inflatable Object.** Vereinigte Gummiwaren-Fabriken Wimpasing vormals Menier, J. N. Reithoffer, Wimpasing, Lower Austria. Represented by W. Zimmermann, E. Jourdan, and W. Paap, all of Berlin S. W. 11.
 1,174,265. **Vise Insert.** E. Hofmann, Ebersbach i. Sa.
 1,174,348. **Sponge Rubber Drip.** A. Epstein, Berlin-Wilmersdorf.
 1,174,634. **Sponge Rubber Lining for Packing Eggs.** H. Liewig, Berlin-Lichterfelde.
 1,174,811. **Label with Rubber Ring.** O. Schmiedel, Buchholz i. Sa.
 1,175,455. **Tube Tire.** Continental Gummiwerke A.G., Hannover.
 1,175,589. **Elastic Binder.** Firma Friedr. Arthur Kuhn, Schonau-Chemnitz.
 1,175,604. **Bracket.** Triton Gummschwamm-Co., G.m.b.H., Dresden A. 1.
 1,175,713. **Rubber Brush for Leather.** F. Baun, Stuttgart.
 1,175,880. **Goggles.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,175,906. **Sponge Rubber Protector.** Continental Gummiwerke A.G., Hannover.
 1,175,970. **Toothbrush.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,175,999. **Heel.** A. Klose, Lehmwasser, Kr. Waldenburg i. Schl.
 1,176,006. **Elastic Sheet.** P. Schweitzer, Wuppertal-Barmen.
 1,176,063. **Jewelry.** New York-Ham-

- burger Gummiwaaren Co., Hamburg 33.
 1,176,064. **Cigarette Holder.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,176,148. **Protective Closing Ring.** Firma B. Braun, Melsungen, Bez. Kassel.
 1,176,677. **Belt.** K. Heucken, Aachen.
 1,176,809. **Lamp Handle.** H. Maehler, Nieder-Ingelheim a. Rh.
 1,176,912. **Heel.** Lindener Gummiwarenfabrik August Seegers, Hannover-Linden.
 1,177,053. **Soft Rubber Roll.** Harburger Gummiwaren-Fabrik Phoenix A.G., Harburg-Wilhelmsburg a. d. E.
 1,177,480. **Milking Stool Leg.** H. Adler, Eibau i. Sa.
 1,177,747. **Dice.** P. Lieskau, Hamburg.
 1,177,749. **Bearing Rolls.** Harburger Gummiwaren-Fabrik Phoenix A.G., Harburg-Wilhelmsburg.
 1,177,912. **Comb.** Rheinische Gummi & Celluloid Fabrik, Mannheim-Neckarau.
 1,178,140. **Inhaling Apparatus.** S. Scheffler, Rostock.
 1,178,142. **Clamp with Rubber Ring.** C. Nelson, Sebnitz.
 1,178,250. **Nail Catcher for Tires.** F. Meiser, Neustadt i. O.-S.
 1,178,261. **Fountain Pen.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,178,307. **Sponges.** Lecinwerk Dr. Ernst Laves, Hannover.
 1,178,393. **Cycle Tire Cover.** Continental Gummiwerke A.G., Hannover.
 1,178,461. **Motor Vehicle Cushion.** A. Nieman, Köln.
 1,178,508. **Spring for Awls.** J. Vogt, Dortmund-Horde.
 1,178,587. **Atomizer.** Nurminger & Sohn, Furth i. Bavaria.
 1,178,600. **Leather and Rubber Patch.** K. Schraudner, Bamberg.
 1,178,691. **Gas Tube.** E. Kubler & Co., m. b. H., Berlin-Reinickendorf-West.
 1,178,767. **Umbrella Handle.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,178,768. **Door and Window Mountings.** New York-Hamburger Gummiwaaren Co., Hamburg 33.
 1,178,848. **Heel.** E. Conrad, Bielefeld.
 1,179,406. **Sponge Cleaner.** C. Lese-mann, Heidenau, Bez. Dresden.
 1,179,464. **Protection for Buckets.** R. Brabender, Wuppertal-Elberfeld.

Designs

Dominion of Canada

- 9,194. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.
 9,222 and 9,223. **Tires.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

Prints

United States

- 13,229. **Shelby's Menthol Chewing Gum.** Chewing gum. Shelby Gum Co., Richland, O.
 13,251. **Lucky Penny Chewing Gum.** Chewing gum. Orbit Listerated Gum Co., Chicago, Ill.

- 13,271. **Wrigley's Pepsin Chewing Gum.** Chewing gum. Wm. Wrigley, Jr., Co., Chicago, Ill.

Trade Marks

United States

- 284,445. Label containing representations of a boy and a girl at play and within boxes the words: "Built on Proper Footforming Lasts. Sturdy-Bilt. Corrective Quality Shoes." Footwear. Jefferson Shoe Mfg. Co., Inc., Newton, N. J.
 284,449. **Sorosis.** Footwear. A. E. Little Co., Lynn, Mass.
 284,454. Label containing the representation of a shoe and the words: "Styled by Rysonéle." Footwear. Rice-O'Neill Shoe Co., St. Louis, Mo.
 284,595. **Gladiator.** Golf balls. National Bellas Hess Co., Inc., New York, N. Y.
 284,620. **Akma.** Druggists' sundries. Akma Sales Co., Boston, Mass.
 284,621. **Vagiphragm.** Druggists' sundries. Akma Sales Co., Boston, Mass.
 284,728. **Sky Line.** Golf balls. Royal Mfg. Co., Toledo, O.
 284,737. **Wings.** Chewing gum. American Chic Co., Long Island City, N. Y.
 284,738. **Phexigum.** Rubberlike substances of organic polymerides. Röhm & Haas A.G., Darmstadt, Germany.
 284,746. **Whoopee.** Inflated cushions. Jem Rubber Co., Ltd., Toronto, Ont., Canada.
 284,767. **Road-Master.** Tires and tubes. Falls Rubber Co., Cuyahoga Falls, O.
 284,797. **Challenge.** Belting, packing, and hose. F. A. Lachance, doing business as Imperial Rubber Co., New York, N. Y.
 284,808. **TR.** Valves. Tire & Rim Assn., Inc., Cleveland, O.
 284,837. **Thinex.** Prophylactic articles. H. E. Moyses, doing business as Vytex Laboratories, New York, N. Y.
 284,838. **Vytex.** Prophylactic articles. H. E. Moyses, doing business as Vytex Laboratories, New York, N. Y.
 284,880. **Proball.** Golf balls. Davega, Inc., New York, N. Y.
 284,919. **Honey Moons.** Chewing gum. Orbit Listerated Gum Co., Chicago, Ill.
 284,954. **Beau Traveler, Sturdy Wear, Worsted, Bench Made Cloths.** Clothing. Ford Naylor, New York, N. Y.
 284,957. **Community.** Tires and tubes. Marshall Field & Co., Chicago, Ill.
 284,958. **Valiant.** Tires and tubes. Marshall Field & Co., Chicago, Ill.
 284,962. **Kontak.** Brake lining. Russell Mfg. Co., Middletown, Conn.
 284,974. **Oh Boy.** Chewing gum. Goudey Gum Co., Allston, Mass.
 284,993. **Dubble Ball.** Chewing gum. F. H. Fleg Corp., Philadelphia, Pa.
 285,004. **Trimene Base.** Condensation product of formaldehyde and ethylamine. Naugatuck Chemical Co., New York, N. Y.
 285,021. **Dr. Copland's Arch-of-Air.** Footwear. Crescent Shoe Co., New York, N. Y.
 285,023. **Floor-Grip.** Non-slip devices. C. B. Brinkworth, Boston, Mass.
 285,053. Rectangle containing a shield containing the words and the letters:

Rubber Questionnaire

*First and †Second Quarters, 1931

"Wm. Isaac & Son, Est. 1869. 88 Bowery, N. Y. C. U. F. F." Footwear. Wm. Isaac & Son, New York, N. Y.
285,096. **Jack White.** Golf balls. Jack White Golf Co., Ltd., London, England.

285,133. **Anniped.** Footwear. A. De Pinna Co., Inc., New York, N. Y.

285,138. **Braemore.** Footwear. Bancroft Walker Co., Boston, Mass.

285,140. Representation of the head of a man and the words: "**Dapper Dan.**" Footwear. J. K. Orr Shoe Co., Atlanta, Ga.

285,155. **Firestone.** Heels. Firestone Footwear Co., Hudson, Mass.

285,219. Representation of a length of rope and the words: "**Raw-Cord by GroCord.**" Footwear. Lima Cord Sole & Heel Co., Lima, O.

285,220. Representation of a length of cord and the words: "**Corded-Crepe by GroCord.**" Footwear. Lima Cord Sole & Heel Co., Lima, O.

285,231. Circle containing the word: "**PeCo.**" Stamps. Precision Electrotyping Co., San Francisco, Calif.

285,294. Representation of a shield containing the word: "**Wyona.**" Footwear. C. E. Miller, Butler, Pa.

285,306. **Ray Parker.** Footwear. Novelty Shoe Co., Chicago, Ill.

Dominion of Canada

52,373. **Red Seal.** Dress shields, elastic, etc. T. Eaton Co., Ltd., Toronto, Ont.

52,396. The word: "**Klinger**" and a triangle with the letters: "**RK.**" India rubber goods. Rich Klinger Gesellschaft mit Beschränkter Haftung, Gumpoldskirchen, Lower Austria.

52,474. **Brighton.** Garters and armbands. Pioneer Suspender Co., Philadelphia, Pa., U. S. A.

52,504. Parallelogram containing the word: "**Viking**" and beneath it another parallelogram with the words: "**Miner, Made in Canada.**" Footwear, clothing, belting, hose, covering for vehicles and animals, cement, druggists' sundries, heels, soles, tires, etc. Miner Rubber Co., Ltd., Granby, P. Q.

52,505. Parallelogram enclosing the word: "**Triumph**" and beneath it another parallelogram with the words: "**Miner, Made in Canada.**" Footwear, clothing, heels, soles, coverings for vehicles and animals, belting, hose, tires, cement, druggists' sundries, etc. Miner Rubber Co., Ltd., Granby, P. Q.

52,506. Parallelogram enclosing the word: "**Invincible**" and beneath it another parallelogram with the words: "**Miner, Made in Canada.**" Footwear, clothing, heels, soles, coverings for vehicles and animals, belting, hose, tires, cement, druggists' sundries, etc. Miner Rubber Co., Ltd., Granby, P. Q.

52,581. **Vogue.** Tires and tubes. H. C. Hower, Chicago, Ill., U. S. A.

52,587. **Tu-Tone.** Tubes. Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

United Kingdom

519,702. Representation of a Zeppelin and on it the word: "**Zeppelin.**" All goods included in Class 40. Goodyear Tire & Rubber Co., Akron, O., U.S.A.

521,525. **Glenlour.** Raincoats, etc. P. Frankenstein & Sons (Manchester), Ltd., Manchester.

RECLAIMED RUBBER	Long Tons							
	Inventory at End of Quarters		Production		Shipments		Consumption	
	1st Q.	2nd Q.	1st Q.	2nd Q.	1st Q.	2nd Q.	1st Q.	2nd Q.
Reclaimers solely	6,255	5,981	11,529	13,974	12,425	14,214	.....	.....
Manufacturers who also reclaim	6,610	6,283	20,586	24,566	5,880	7,629	17,744	18,669
Other manufacturers	3,277	3,518	.....	.....	.....	.....	11,933	13,840
Totals	16,142	15,782	32,115	38,540	18,305	21,843	29,677	32,509

SCRAP RUBBER	Long Tons					
	Inventory		Consumption		Due on Contract	
	1st Q.	2nd Q.	1st Q.	2nd Q.	1st Q.	2nd Q.
Reclaimers solely	30,450	29,412	14,633	17,138	7,742	6,897
Manufacturers who also reclaim	26,576	29,493	26,641	30,528	22,934	22,010
Other manufacturers	172	198	.....	.....	.....	.....
Totals	57,198	59,103	41,274	47,666	30,676	28,907

Tons of Rubber Consumed in Rubber Products and Total Sales Value of Shipments

PRODUCTS	Crude Rubber Consumed Long Tons		Total Sales Value of Shipments of Manufactured Rubber Products	
	1st Q.	2nd Q.	1st Q.	2nd Q.
Tires and Tire Sundries	55,912	68,971	\$75,317,000	\$100,861,000
Automobile and motor truck pneumatic casings ..	10,670	12,690	11,384,000	14,135,000
Automobile and motor truck pneumatic tubes	38	102	99,000	204,000
Motorcycle tires (casings and tubes)	178	262	490,000	568,000
Bicycle tires (single tubes, casings, and tubes) ..	15	22	83,000	92,000
Airplane casings and tubes	872	759	1,434,000	1,458,000
Solid and cushion tires	72	72	186,000	186,000
All other solid tires	836	1,016	2,346,000	2,996,000
Tire sundries and repair materials .....	.....	.....	.....	.....
Totals	68,593	83,894	\$91,339,000	\$120,500,000
Other Rubber Products	.....	.....	.....	.....
Mechanical rubber goods	4,319	4,751	\$17,358,000	\$19,527,000
Boots and shoes	2,234	2,683	11,148,000	12,052,000
Insulated wire and insulating compounds	1,054	959	\$4,719,000	\$4,650,000
Druggists' sundries, medical and surgical rubber goods	471	310	1,774,000	1,560,000
Stationers' rubber goods	323	349	425,000	450,000
Bathing apparel	199	350	487,000	1,623,000
Rubber clothing	210	199	691,000	699,000
Automobile fabrics	167	199	1,201,000	1,336,000
Other rubberized fabrics	452	612	1,323,000	1,512,000
Hard rubber goods	207	246	\$949,000	\$1,063,000
Heels and soles	2,194	2,382	4,391,000	4,827,000
Rubber flooring	188	270	560,000	712,000
Sporting goods, toys, and novelties	699	655	2,315,000	3,897,000
Miscellaneous, not included in any of the above items	1,170	1,276	3,923,000	3,859,000
Totals	13,887	15,241	\$51,264,000	\$57,767,000
Grand totals—all products	82,480	99,135	\$142,603,000	\$178,267,000

Inventory of Rubber in the United States and Afloat

ON HAND	Long Tons							
	Plantation		Para		All Others		Totals	
	1st Q.	2nd Q.	1st Q.	2nd Q.	1st Q.	2nd Q.	1st Q.	2nd Q.
Manufacturers	135,537	137,323	2,302	1,999	301	291	138,140	139,613
Importers and dealers	48,088	42,193	1,197	1,226	328	292	49,613	43,711
Totals on hand	183,625	179,516	3,499	3,225	629	583	187,753	183,324
AFLOAT	.....	.....	.....	.....	.....	.....	.....	.....
Manufacturers	13,160	12,174	.....	.....	.....	.....	13,160	12,174
Importers and dealers	36,186	40,392	125	92	.....	.....	36,311	40,484
Totals afloat	49,346	52,566	125	92	.....	.....	49,471	52,658

*FIRST QUARTER—Number of rubber manufacturers that reported data was 174; crude rubber importers and dealers, 51; reclaimers (solely), 6; total daily average number of employees on basis of third week of January, 1931, was 121,373.

†It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory figures 86 per cent; and afloat figures 78 per cent; the reclaimed rubber production 83 per cent; reclaimed consumption 82 per cent; and reclaimed inventory 88 per cent of the total for the entire industry.

*SECOND QUARTER—Number of rubber manufacturers that reported data was 168; crude rubber importers and dealers, 47; reclaimers (solely), 6; total daily average number of employees on basis of third week of April, 1931, was 119,150.

†It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory 81 per cent, and afloat figures 76 per cent; the reclaimed rubber production 83 per cent; reclaimed consumption 82 per cent; and reclaimed inventory 88 per cent of the total of the entire industry.

‡One company did not report its sales, but did report crude rubber consumption, stocks, etc. Compiled from statistics supplied by the Rubber Manufacturers Association, Inc.

522,773. **Darex.** Soles and heels. Dewey & Almy, Ltd., London.

523,641. **Kenbarr.** Goods not included in classes other than Class 40. John Barker & Co., Ltd., London, W. 8.

523,961. **Alcol.** Footwear. I. T. S. Rubber Co., Ltd., Hampshire.

524,027. **Flying Scotsman.** Belting. Richard Lloyd & Co., Ltd., Birmingham.

Making Inner Tubes

THE following abstracts of United States patents relating to the manufacture of inner tubes are continued from INDIA RUBBER WORLD, August 1, 1931:

159. Maynard, 1,694,225. Dec. 4, 1928. In vulcanizing inner tubes the valve stem is applied in two parts; one of which rests freely upon the inside of the tube rubber during vulcanization and the other is attached thereto through the valve hole after vulcanization.

160. Stevens, 1,694,238. Dec. 4, 1928. A machine for splicing tubes has a base plate, a pair of tube engaging members, and means to cause the members to separate to hold the end of the tube distended and unobstructed to receive the other end of the tube therein.

161. Kuhlke, 1,709,796. Apr. 16, 1929. The process of constructing endless tubes for vulcanization comprises forming bands of unvulcanized rubber of different diameters, the smaller being of a diameter equal to the interior diameter of the completed tube, and uniting the bands together along their edges. (See group illustration.)

162. Stevens, 1,711,474. Apr. 30, 1929. A tube cuffing device comprises a hollow cylinder of comparatively large diameter adapted to receive a mandrel, and means for cuffing a tube on the mandrel onto the cylinder, the means comprising a movable mounting and a circumferential series of yielding fingers on the mounting arranged about the cylinder.

163. Eberhard, 1,712,335. May 7, 1929. The method of making rubber tubes comprises continuously forming a strip of rubber tube stock, continuously forming and applying to the first strip a relatively narrow reenforcing strip, severing the assembled strip into blanks, forming the blanks into endless tubes, and then molding the tubes. (See group illustration.)

164. Fleischli, 1,713,958. May 21, 1929. An apparatus for making rubber tubes comprises constantly rotated rolls between which compounded rubber material is passed to produce a continuous sheet of material, means comprising an endless conveyer whereby the free end portion of the sheet of material is intermittently advanced while the sheet is being formed, and electrical means adapted to be actuated automatically to start and stop the endless conveyer.

165. Whittier, 1,716,608. June 11, 1929. A method of manufacturing an inner tube for tire casings consists in placing a valve

pad on rubber tube material, locating a paper transfer strip partially across the valve pad, rolling the whole about a mandrel, and vulcanizing pad and tube together.

166. Gillespie, 1,718,645. June 25, 1929. The object of the invention is to provide an inner tube in which the valve is secured by vulcanization whereby it is integral with the tube, and leakage of the tube about the valve is avoided.

167. Gillespie, 1,718,646. June 25, 1929. The process of making inner tubes with S-valves comprises providing a valve with a base, inserting the valve in the tube during the preliminary shaping operation, molding, and vulcanizing the tube to embed the base of the valve in the wall, and bending the valve to S-shape.

168. Young, 1,719,206. July 2, 1929. Splicing apparatus comprises a pair of splicing sleeves, respective arms supporting the same, one of the arms being pivotally mounted, yielding means for swinging the latter arm toward the other arm, and positive means for further forcing it into cooperative relation therewith. (See group illustration.)

169. Sanderson, 1,721,975. July 23, 1929. Apparatus for forming tubes comprises a flat sheet support including an intermediate member and side members pivoted thereto and a protector movable into and out of overlapping relation to the free margin of one of the side sections.

170. Mather, 1,723,571. Aug. 6, 1929. The method comprises forming an annular band of stock, forcing the central portion of the band outwardly to form an annulus having a substantially U-shaped cross section, bringing the edges of the U together in face to face relation, and stitching the edges together.

171. Kraft, 1,724,354. Aug. 13, 1929. The method includes extruding a tube of material onto a mandrel, cutting off a section of the extruded material which is longer than the mandrel, turning the ends of the section back over the ends of the mandrel, and securing the enclosed portion of the section in position within the mandrel by inserting tapered plugs into the ends of the section and the mandrel.

172. Blake, 1,727,391. Sept. 10, 1929.

The method of making tubes comprises forming the tube with a reentrant fold giving it a double walled U-form in cross section, enclosing the tube in a mold, distending it in the mold by internal fluid pressure, and vulcanizing it while so distended.

173. Young, 1,730,638. Oct. 8, 1929. The method of applying a powdered material to the interior of an extruded tube during the extrusion comprises slowly conveying a column of the material through the extruding machine to the interior of the tube and there blowing it against the wall of the tube.

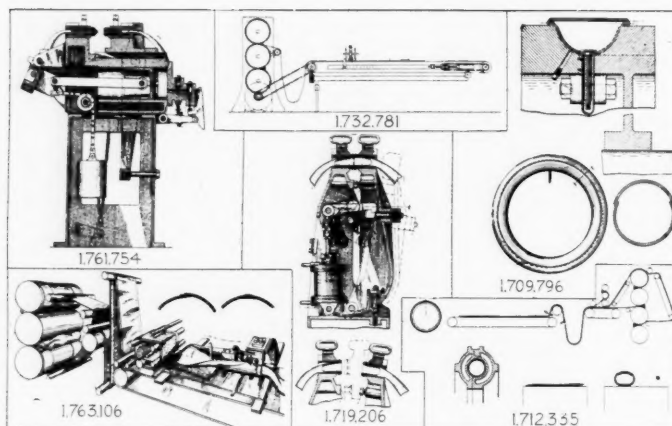
174. Tiffany, 1,732,781. Oct. 22, 1929. A tube rolling apparatus comprises a movable stock supporting table and means for severing the stock a predetermined distance from an end thereof, comprising a pair of spaced cutting disks and a compressible disk of relatively greater diameter mounted to rotate with the first mentioned disks. (See group illustration.)

175. Tiffany, 1,735,303. Nov. 12, 1929. A tube making apparatus comprising delivering and receiving conveyer belts for supporting a sheet of tube stock material, means for severing the material between the belts, and means for moving the supporting roller at the delivering end of the first belt away from the receiving end of the second belt.

176. Moomy, 1,740,029. Dec. 17, 1929. A method of making rubber tubing consists in extruding the tubing in a hot condition upon the surface of a regulatable current of cold water flowing away from the extruder and in approximately the same direction as the extruder tubing while maintaining the current of water at a predetermined temperature throughout its length.

177. Remark, 1,746,200. Feb. 4, 1930. An inner tube is made by vulcanizing a tube under internal pressure with an angle valve stem positioned with the bent portion of the valve stem extending in the direction of the tube and subsequently twisting the valve stem to a different position in the completely vulcanized tube and securing it in position.

178. Minor, 1,746,357. Feb. 11, 1930. Inner tubes are vulcanized in the usual



mold, and heated carbon-dioxide is passed into the tube during vulcanization to accelerate the cure.

179. Denmire, 1,754,502. Apr. 15, 1930. The method of forming annular tubes consists in continuously feeding a sheet of raw rubber intermittently festooning the sheet, drawing portions of opposite sides of each festoon into the form of annular channels, severing the channeled portions, and joining the edges thereof.

180. Shook, 1,761,754. June 3, 1930. Tube splicing apparatus comprises a pair of splicing sleeves mounted for relative movement, each including a section movable to open and close the sleeve, a common treadle device for moving the sections to open the sleeves, and operating connections between the sections and the treadle device. (See group illustration.)

181. Maynard, 1,762,831. June 10, 1930. The splice is prepared with cement and joined as usual with the exception that an extremely rapid accelerator is used in the cement to reduce the time of cure to such an extent that the vulcanized material will not suffer any permanent set during the vulcanization of the splice. After the splice has been cemented and united it is subjected to a pressure serving to flatten it in one direction; the tube is pressed flat upon itself without the interposition of any mandrel whatever. The tube is then removed from the pressing means and cooled. It is then flattened in the opposite direction and again subjected to vulcanizing heat.

182. Snyder, 1,763,106. June 10, 1930. The method comprises progressively forming a flat sheeted strip of unvulcanized rubber, feeding it from the forming position, and progressively folding its side margins into contact with each other, and forming a tube of the strip as it is so fed. (See group illustration.)

183. Denmire, 1,786,290. Dec. 23, 1930. The rubber articles are inflated with air under pressure during vulcanization. After vulcanization the same air is repeatedly used for inflating the next batch. Ammonium carbonate is added to compensate for the loss of air. (Concluded.)

FRANCE

(Continued from page 88)

ranks third as exporter of automobile tires, having fallen behind both the United States and Canada. Today the greater part of French tire exports goes to the French colonies.

Shipments of rubber footwear from France also sharply declined for the three months under review; the value was 2,842,000 instead of 6,233,000 francs.

Imports of most articles, except automobile tires and tubes, also receded considerably during the first three months of the current year. Tires and tubes imported by France amounted to 22,722,000 francs, against 20,919,000 for the same period in 1930. Footwear, on the other hand, was only 1,007 quintals against 1,723, a decline chiefly reflected in the greatly reduced shipments from the United States. Other rubber goods fell from 9,852,000 to 7,332,000 francs; and vulcanized rubber thread, chiefly supplied by the United States, dropped from 7,137,000 to 4,341,000 francs.

Finding Employment

Robert C. Kelley

BEFORE this depression many industries merged for relief from "profitless prosperity." This policy was particularly true of the rubber industry, which for the past decade has not shown profits consistent with its importance and size. No one questions the wisdom or the need of many of these mergers. But it is realized now that the peak of these combinations has passed, that they have effected additional unemployment, and what is more important, that kind of unemployment not helped in the slightest by relief programs, doles, or increased public works outlays.

In the readjusting and realigning of organizations after a merger, many executives, office clerks, salesmen, and foremen, and good ones too, hear their "services are no longer required." For these men this article is written to give them some encouragement and the benefit of the experience of others who have been through the same mill but have in the end come out on top.

Above all abolish every bitter and rancorous thought. No matter how keenly you resent the action which precipitated your resignation, hide your feelings. Nothing militates against an applicant for a position more than resentful or mentally disturbed attitude.

If you are a manufacturing man, you have doubtless had a varied experience. One head of a large concern rotates his executives in different types of work. By this policy he feels he is helping not only his organization but the man himself, as such experience broadens his viewpoint and gives him a better chance of finding a new connection when necessary.

The hardest task perhaps, confronts the man who has had one job for ten or fifteen years. Remember, if such is your case, you will seldom find an opening offering the exact work you had been doing.

In seeking a new post first carefully and thoroughly analyze and write out the various details of your experience. Remember, procuring a position is principally salesmanship. The prime requisite is to know what you are selling, which is yourself.

Next, find a customer. Strangely enough, many men here make their biggest mistake. They pick their prospects poorly and invariably approach the wrong people. If you want a job as a pressroom foreman don't apply to the pressroom foreman; for he isn't interested in someone seeking his job. See instead the superintendent. Similarly, if you are a superintendent, don't discuss your case with the superintendent. Go to the general manager or the vice president in charge of manufacturing.

Another mistake often made is relying too much on "stock-in-trade." In the last few years many executives, particularly in rubber, accumulate plans and data of various methods they have evolved, then try to use them as a basis for a connection. They do not realize that one man's meat

is another's poison, or that what may be successful in one plant will not go in another, owing to different conditions. Frequently, too, a new method, functioning well when the man in question left the plant, is superseded by improved processes, without his knowledge; thus unwittingly he is trying to sell himself on the strength of out-of-date methods. Management today is skeptical also of executives who may bring in their wake large equipment expenditures along somewhat revolutionary lines.

Records of past achievements are useful because they show brains and versatility to solve problems. These qualities coupled with the ability to fit into and work with an organization should be most stressed. Two plodders who work together and co-operate are usually more valuable than two geniuses constantly at odds.

Many men err in relying too much on employment agencies, even those specializing in executive positions. Their main interest naturally is their fee; and their methods soon become stereotyped and impersonal. "Situations Wanted" advertisements in newspapers are of little value for a specialized field, but are more effective in the trade journal of your industry for it reaches the right audience.

The two other means are personal interviews and letters. The former should be carefully planned with the right people, and the latter personally and thoughtfully written.

Laziness and inertia will get you nowhere. In looking for a new position, if you perform that task correctly, you work as hard as or harder than when employed. Your predicament calls for constant study, alertness, judgment, and salesmanship.

After exhausting all the possibilities in the rubber industry, you may possibly have to leave it for another field. By this course you may seem to be throwing away years of experience. Not necessarily. You certainly are not losing their lessons in experience, judgment, and foresight.

Character and ability are your biggest assets. Experience is also valuable but not so much as the other two. Keep your courage up, think and work hard, and you will eventually win. Remember, finally, that the person who can do the most for you is yourself.

A WARMER WAS ATTEMPTING TO CUT OFF stock on a warming mill on which he was breaking down crude rubber. He made his cut and followed it, rolling the stock with his left hand until he was ready to cut off. Instead of cutting off, holding the small mill knife in his right hand with the blade pointing upward, he pulled the roll of rubber away from the mill. When the rubber broke, the knife in his hand inflicted a severe laceration on his left eyelid as the roll snapped toward his face. This accident resulted in 9 days lost. *Rubber Section News Letter*. N. S. C.

FINANCIAL

Intercontinental Rubber Co.

TO THE STOCKHOLDERS: The crude rubber market has continued its downward trend with conditions approaching demoralization, involving heavy losses to all producers, and apparently no relief is immediately in sight. First latex plantation rubber is selling for 5½ cents per pound or less than half the out-of-pocket cost to the Caucasian section of the industry as a whole. How long it will be before the pressure of continued overproduction is relieved by the shutting down of some of the higher-cost plantation companies it is impossible to predict, but such a result seems inevitable.

For the duration of this unprecedented depression, your company has adopted and will continue a policy of retrenchment to such degree as is consistent with conservation of its properties and the essence of its new developments. This involves the suspension of new work in California and elsewhere.

Attention is called to the further reserve of \$9,441.09 that has been set up to cover the difference between the cost of rubber inventory and market value as of June 30.

GEORGE H. CARNAHAN,
President.

Wilmington, Del.
Aug. 15, 1931.

Raybestos-Manhattan, Inc.

Raybestos-Manhattan, Inc., Passaic, N. J., earned \$580,179.48, or 86 cents per share during the six months ended June 30, 1931, as compared with \$825,499.11, or \$1.22 per share, during the same period one year ago, and \$331,271.01, or 49 cents per share, during the six months ended December 31, 1930.

All of the company's divisions operated at a profit during the half year. The company's balance sheet at the end of June showed current assets of \$8,266,178.05 including \$3,126,606.41 of cash and cash funds. The current liabilities were \$553,314.11, and the ratio between current assets and current liabilities was 15 to 1. There were no bank loans or funded debt.

Consistent improvement has been shown in earnings for each quarter of this year and despite the disbursement of \$864,344 in dividends, the net working capital remains approximately the same as at the beginning of the year. Substantial economies have been effected, and the divisional budgets indicate that further ones in prospect will be accomplished with good results.

The directors declared a dividend of 40 cents per share, payable September 15, to stockholders of record August 31, 1931.

Goodyear Tire & Rubber Co.

Operating economies of the Goodyear Tire & Rubber Co. during the first half year were sufficient to produce a moderate improvement in operating profit margin over last year despite a 24 percent decline in dollar value of sales, and despite continued heavy charges for depreciation and adjustment of raw material inventories to market prices as of June 30.

Operating profit for first six months was \$5,896,397 after expenses, depreciation of \$6,479,952, and a charge of \$1,761,261 to adjust inventories to market levels. This represented 7.08 per cent of net sales of \$83,228,661; while in the first half last year, operation profit of \$7,337,988 was 6.62 per cent of net sales amounting to \$110,804,582.

As a result of these lower costs, the decline in net after charges and minority interests was held to the same proportion as the falling off in sales, with net of \$4,221,770, or \$1.06 a share after preferred dividends, against \$5,592,309 or \$2.02 a share in the like period of last year.

New Jersey Zinc Co.

New Jersey Zinc Co., 160 Front St., New York, N. Y., for the quarter ended June 30 reports net income of \$865,252 or 44 cents a share compared with \$860,769 or about the same sum per share in the first quarter of the year and 72 cents a share in the quarter ending June 30, 1930. For the six months net income was \$1,726,021. Payment of \$1,963,264 in dividends of 50 cents a share for two quarterly periods left a balance of \$237,264 provided from surplus account.

The B. F. Goodrich Co.

The B. F. Goodrich Co., Akron, O., and subsidiaries report for six months ended June 30, 1931, net loss of \$288,483 after depreciation, minority interest, etc., and after writing down raw material on hand and on commitment to the lower cost or market on June 30, last, comparing with net loss of \$1,292,986 in first half of 1930.

Consolidated net sales in the six months ended June 30, were \$59,878,000, compared with \$78,007,291 in the like period of 1930.

In accordance with the usual midyear practice of the company, the material content of semi-finished and finished goods was valued at cost.

The company states that second quarter operations showed a marked improvement compared with the first quarter of the year; while the current position is very satisfactory, with the current ratio being approximately 3.6 to 1.

Kelly-Springfield Tire Co.

Operations of the Kelly-Springfield Tire Co., Cumberland, Md., for the six months' period ended June 30, 1931, showed a profit of \$116,855 after all charges but before deduction for depreciation. After deducting depreciation of \$398,291, a net loss of \$281,436 resulted.

Current assets were \$10,633,182 before deducting reserve for raw material commitments as compared with \$9,315,529 at December 31; current assets after deduction for commitment reserve were \$10,098,717 as compared with \$8,555,529; current liabilities at June 30 were \$2,230,617 as compared with \$701,709 at December 31; net working capital after deduction of reserve for raw material commitments was \$7,868,100 as compared with \$7,853,820 at December 31, 1930, including customers' deferred balances at both periods.

No adjustment to raw materials was necessary at June 30. Reserve for commitments set up at December 31, 1930, was deemed sufficient to reduce to market raw materials on hand as well as commitments for 1931, purchases having been made during the year at favorable prices. Raw material contents of finished goods and goods in process were valued at cost. Unit sales to dealers for six months in 1931 showed a substantial increase over a like period of 1930.

United States Rubber Co.

A net loss of \$4,660,202 after all charges including \$4,709,976 for depreciation, is reported by the United States Rubber Co., 1790 Broadway, New York, N. Y., for the six months ended June 30, last, as compared with a net loss of \$2,797,403 after like charges in the first half of 1930 and a net profit of \$568,641 in the same 1929 period. Net profits from operations this year totaled \$49,774.

Net sales for the half year totaled \$60,540,047, as compared with \$75,206,983 in the same 1930 period and \$85,073,346 in 1929. The corporation retired funded debt in the amount of \$2,888,300 during the six months of this year.

The balance sheet as of June 30 shows current assets of \$77,298,168 and current liabilities of \$12,221,941, leaving net quick assets of \$65,086,227. At the end of June, 1930, working capital was \$86,154,339 and totaled \$104,565,750 on June 30, 1929.

Provisions for depreciation and amortization of the corporation's plantations amounted to \$675,000. After this provision and other charges the net loss on the plantations was \$790,000 for the period. These results were not included in the semi-annual statement.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Baldwin Rubber Co.	Class A	\$0.37½ q.	Sept. 30	Sept. 20
Boston Woven Hose & Rubber Co.	Com.	\$1.00 q.	Sept. 15	Aug. 31
Firestone Tire & Rubber Co.	"A" Pfd.	\$1.50 q.	Sept. 1	Aug. 15
Gates Rubber Co.	Pfd.	\$1.75 q.	Sept. 1	Aug. 15
Goodyear Tire & Rubber Co.	1st Pfd.	\$1.75 q.	Oct. 1	Sept. 1
Raybestos-Manhattan, Inc.	Com.	\$0.40 q.	Sept. 15	Aug. 31

CHEAP RUBBER MAY BE SUBSTITUTED for dear chiclé in chewing gum and rendered tasteless, by gradually melting together a mixture of rubber with paraffin or similar wax at 132 to 145° C. and adding suitable flavoring and modifying ingredients.

Market Reviews

Crude Rubber

New York Exchange

WITH rubber prices going below 5 cents, the market has felt the full force of the unfavorable statistical position in which it finds itself.

Because rubber shipments have continued at levels exceeding all expectations, the announcement that the Dutch Government had abandoned all restriction efforts was enough to send the market to the 5-cent level for the first time. Even a slight hope that the huge shipments would be cut down lent firmness to the market to some extent; but when even this feeble prop was removed, the market broke.

Political and financial developments in Europe affected the market, of course, but conditions within the industry were primarily to blame. The trouble has been that instead of production declining at each decline in the price of rubber, it has been maintained and even increased. The reason seems to be that as the price declines, it becomes necessary for the native grower to tap more rubber to get the same amount of money that he did when prices were higher. While many estates with low-yielding rubber have been forced to the wall, the remaining growers seem to have made up for these shutdowns by increased production.

But the opinion is now expressed in London that present prices at last have reached the point where it is not profitable even for the native grower to tap, and that many failures should result. This question is debatable because it has not been established definitely that 5 cents, or any other price, is a minimum at which the na-

tive grower can exist. But restriction has been taken up with renewed vigor, and a workable plan may result.

Week ended August 1. On Wednesday rubber reached a new record low price when the August delivery sold at 5.60 cents. Then, the next day, the market sold off 10 more points to reach another new low at 5.50 cents.

The market seemed to drift along to the lower levels, without any evident support. The tone was steadier toward the end of the week when traders evened up in anticipation of the three-day bank holiday in London. Business in London and Singapore will not be resumed until Tuesday.

Automobile manufacturers are still denying rumors that they will close their plants for summer vacations. The keen competition anticipated between manufacturers of low-priced cars is expected to give the business a big boost. The introduction of free wheeling into the low-priced field is expected to make other manufacturers look to their laurels.

June production of automobiles totaled 249,462 vehicles, compared with 315,115 in May, a decrease of 65,653, according to the Department of Commerce. For the first six months of 1931 production of all types of cars was 1,568,478 units, compared with 2,198,580 in 1930.

June exports for the Dutch East Indies, according to the Rubber Exchange, showed the largest falling off in sections containing mostly European-owned estates. The figure was 24,317 tons, compared with 25,530 tons during May, and in June, when the tapping holiday was in force, the shipments were 19,321 tons.

RUBBER BULL POINTS

1. Agitation for restriction is new and stronger.
2. London opinion is that at prices below 5 cents many producing estates without adequate financial resources will fail.
3. The Ceylon Government proposed a rubber tax.
4. World auto stocks are at a low level.
5. Untapped rubber acreage in Malaya has increased from approximately 17,000 to 37,000 acres in the first four months of this year, though it has been mostly in low-yield rubber.
6. Sales of pneumatic casings may be greater than in 1930.

RUBBER BEAR POINTS

1. Estimates of Malayan shipments for August range from 44,000 to 47,000 tons.
2. Automobile output has declined more than seasonally.
3. Consumption in the United States for July was 31,937 tons, compared with arrivals of 41,004 tons. Consumption in June was 37,916 tons, and in July last year 29,245 tons.
4. Stocks on hand and afloat to the United States are over 300,000 tons; stocks in London and Liverpool exceed 135,000 tons; world stocks are in excess of 550,000 tons.
5. Stocks in the Far East in the hands of dealers at the end of July amounted to 43,831 tons, compared with 43,010 at the end of June, and 39,461 on July 31, 1930.
6. Production in the Far East on 615 estates for the first seven months of this year totaled 149,502 tons, against 140,351 in 1930, and 148,358 in 1929.
7. Dutch estate production is being well maintained and Dutch natives show a surprising degree of adaptability to the low price of recent months, according to the Department of Commerce.
8. Revised figures for 1930 indicate a renewal rate of 1.596 casings per car instead of 1.65.

Statistics compiled by the Department of Commerce show that the indicated production for the first five months of 1931 points to an annual output of 449,000 tons in Malaya. Reports from the Colombo vice consul reveal that a number of estates in Ceylon have closed down. Both European and native estates have been affected, says the report, including two European estates over 1,000 acres each. There is every indication of this movement becoming more general.

In reference to restriction talk an editorial in the *Straits Times* of June 10 is an example of the best opinion:

"... But apart from the Dutch attitude, we still believe that, taking the long view, the wisest course is to let the rubber industry alone. . . . The Malayan Government, in considering the desirability or otherwise of international rubber restriction (and it is purely an academic consideration at present) must recognize that the Dutch, having regard to the nature of their native rubber areas, cannot control the new plantings which an increase in the price of rubber would inevitably cause, and that the present adversity in Malaya, with all its distress and hardship, is having a most salutary effect in destroying the faith of our peasantry in rubber, is causing increased production of rice and other food crops, and is creating a much more practical interest in the diversification of estate agriculture."

Prices at the close of August 1 on No. 1 Standard contract follow:

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—NO. 1 STANDARD CONTRACTS

POSITIONS 1931	July, 1931				August, 1931								
	28	29	30	31	1	3	4	5	6	7	8	10	11
July	5.85	5.72	5.60	5.64									
Aug.	5.90	5.75	5.63	5.67	5.67	5.66	5.56	5.50	5.48	5.37	5.37	5.25	5.32
Sept.	5.95	5.82	5.70	5.74	5.74	5.73	5.67	5.53	5.55	5.44	5.44	5.32	5.40
Oct.	6.02	5.89	5.78	5.82	5.82	5.81	5.74	5.63	5.64	5.52	5.52	5.39	5.45
Nov.	6.09	5.96	5.86	5.90	5.90	5.89	5.82	5.70	5.73	5.60	5.60	5.46	5.54
Dec.	6.17	6.05	5.95	5.98	5.98	5.97	5.90	5.77	5.82	5.68	5.68	5.54	5.63
1932													
Jan.	6.24	6.12	6.02	6.05	6.05	6.04	5.97	5.84	5.89	5.75	5.74	5.61	5.71
Feb.	6.31	6.19	6.09	6.13	6.13	6.11	6.04	5.90	5.96	5.82	5.80	5.67	5.78
Mar.	6.39	6.26	6.16	6.21	6.20	6.19	6.11	5.97	6.03	5.89	5.86	5.74	5.85
Apr.	6.49	6.33	6.24	6.29	6.28	6.27	6.16	6.05	6.11	5.96	5.94	5.82	5.93
May	6.59	6.41	6.32	6.37	6.36	6.35	6.26	6.13	6.18	6.04	6.03	5.90	6.01
June	6.69	6.50	6.41	6.46	6.46	6.45	6.36	6.24	6.28	6.14	6.13	6.00	6.07
July					6.59	6.55	6.46	6.35	6.38	6.24	6.23	6.10	6.15

POSITIONS 1931	August, 1931											
	12	13	14	15	17	18	19	20	21	22	24	25
July	5.26	5.22	5.41	5.31	5.12	5.12	5.14	5.22	5.02	4.98	5.00	4.97
Aug.	5.32	5.28	5.48	5.38	5.15	5.15	5.17	5.25	5.07	5.03	5.05	5.00
Sept.	5.39	5.35	5.55	5.46	5.25	5.25	5.24	5.32	5.14	5.10	5.13	5.08
Oct.	5.46	5.42	5.68	5.54	5.30	5.30	5.32	5.39	5.22	5.16	5.21	5.17
Nov.	5.55	5.50	5.74	5.63	5.35	5.35	5.40	5.46	5.30	5.22	5.29	5.26
Dec.												
1932												
Jan.	5.62	5.57	5.81	5.70	5.42	5.42	5.47	5.53	5.36	5.28	5.37	5.32
Feb.	5.69	5.63	5.88	5.77	5.49	5.49	5.54	5.61	5.43	5.35	5.45	5.39
Mar.	5.75	5.70	5.94	5.84	5.56	5.56	5.62	5.69	5.50	5.42	5.53	5.47
Apr.	5.83	5.79	6.00	5.91	5.63	5.63	5.70	5.76	5.57	5.51	5.61	5.54
May	5.90	5.88	6.10	5.98	5.70	5.70	5.78	5.83	5.65	5.60	5.69	5.62
June	5.98	5.96	6.16	6.05	5.79	5.79	5.86	5.90	5.72	5.69	5.77	5.70
July	6.06	6.04	6.22	6.13	5.88	5.88	5.94	5.98	5.80	5.78	5.85	5.78

on June 30 and 58,326 tons on July 31 last year.

The tone of the market at the week-end was stronger because of the firmness in the stock market and the stronger London cables.

Prices at the close of August 15 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Aug.	5.31		5.41	
Sept.	5.38		5.48/5.50	
Oct.	5.46		5.55	
Nov.	5.54		5.68	
Dec.	5.63		5.74	
Jan.	5.70		5.81	
Feb.	5.77		5.88	
Mar.	5.88	5.82	5.84	
Apr.		5.91	6.00	
May		5.98	6.10	
June		6.05	6.16	
July		6.13	6.22	
Spot		5.50	5.40	

Week ended August 22. Announcements of bank failures at Akron and Toledo, both in Ohio, toward the close of the market on Monday upset prices considerably. On Tuesday a prediction of large Malayan shipments again for August carried the old "A" contract to a new old-time low of 4.90 cents. Wednesday the market firmed on an announcement of a stabilization sponsored by the Ceylon Government, and further talk the next day of a 50 per cent restriction plan sent the market up 8 points. But heavy liquidation, and weakness in the stock market on Friday turned the market downward again. The market closed easier over the week-end.

In reference to the low set in the "A" contract, the Rubber Exchange published the following announcement: "This price was 20 points* below the previous close and a new all-time low for the Exchange,

which witnessed a high of 63.60 cents paid in 1926. Prior to the establishment of the local Rubber Exchange, crude rubber sold in the outside market here at \$1.25 per pound.

"Yesterday's selling was attributed to estimates on Malayan shipments for August placed at over 44,000 tons to all countries, which again were said to be in excess of monthly requirements. A new price of 2½d. a pound was reached in the London market yesterday."

The continued low price has caused much consternation among Dutch and British growers. It is feared that many failures will ensue in the next few months unless a restriction scheme can be put through to save the situation. A dispatch to the Exchange in London said this in part:

"In current prices for crude rubber London traders see drawing appreciably nearer the inevitable end for many producing estates with inadequate financial resources. But until this point is reached they find it difficult to visualize any improvement in market conditions. As they see it, continued overproduction can lead only to a further fall in prices."

Because of the low prices the Ceylon Government was reported to be considering a scheme for restriction that would stabilize prices at about 12 to 18 cents a pound. It was proposed that a deputation meet with representatives from the Dutch East Indies, and the Malay states, either in Batavia, Colombo, or Kuala Lumpur.

The suggestion was made that the several governments levy a tax which would be payable in rubber. The rubber thus received could be used for any purpose

except competitive sale in the market. Should it be unusable, the rubber received in payment of taxes would be destroyed.

Prices at the close of August 22 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Aug.			4.98	5.02
Sept.			5.03/5.05	5.07/5.12
Oct.			5.10	5.14
Nov.			5.16	5.22
Dec.	5.28	5.24	5.22/5.25	5.30
Jan.			5.28	5.36
Feb.			5.35	5.43
Mar.	5.50	5.44	5.42/5.45	5.50
Apr.			5.51	5.57
May	5.62	5.60	5.60	5.65
June			5.69	5.72
July	5.80	5.78	5.78/5.80	5.80/5.85
Spot			5.10	5.15

Prices on August 24 did not get far above the low levels reached Saturday. Most of the business was done in the No. 1 Standard contract, and quotations were from 2 to 11 points higher. In a light market on the 25th prices receded only a fraction. Price movement was narrow on August 26, when standard contracts closed 4 to 8 points lower, at 4.83 cents, nominal.

Price Differentials

Price differentials between the various grades of plantation rubber which shall prevail on all deliveries against the old "A" contracts for September, 1931, are: off quality first latex crepe at one-tenth of a cent (.1c.) per pound; good f. a. q. ribbed smoked sheets at two-tenths of a cent (.2c.) per pound; ordinary f. a. q. ribbed smoked sheets at thirty-five one-hundredths of a cent (.35c.) per pound.

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and August 27, the current date

Plantation Hevea	August 26, 1930	July 27, 1931	August 27, 1931	South American	August 26, 1930	July 27, 1931	August 27, 1931
Rubber latex (Hevea)....gal.	\$1.00 @	\$0.75 @	\$0.75 @	PARAS—Continued			
Sheet				Islands, fine	\$0.13 @	\$0.08 @	\$0.08 @
Ribbed, smoked spot.....	.09¾ @ .09¾	.06¼ @	.05½ @ .05½	Islands, fine	*.16½ @	*.11½ @	*.11½ @
August-September .....	.09¾ @ .09¾	.06¼ @	.05½ @ .05½	Acre, Bolivian, fine.....	.12½ @	.08¾ @	.08¾ @
October-December .....	.10 @ .10½	.06¾ @	.05½ @ .05½	Acre, Bolivian, fine.....	.17 @	.12¾ @	*.12¾ @
January-March .....	.10¼ @ .10½	.06¾ @	.05½ @ .05½	Beni, Bolivian .....	.12½ @	.09 @	.08 @
April-June	@	@	.05½ @	Madeira, fine .....	.12¾ @	.08½ @	.08 @
CREPE				CAUCHO			
No. 1 Thin latex (first latex) spot .....	.10¼ @	.06¼ @	.05¾ @	Upper caucho ball.....	.06 @	@	@
August-September .....	.10¼ @	.06¾ @	.05¾ @	Upper caucho ball.....	*.10½ @	*.07½ @	*.07 @
October-December .....	.10½ @	.06¾ @	.05¾ @	Lower caucho ball.....	.05½ @	@	@
January-March .....	.10¾ @	.07½ @	.06½ @	Manicobas			
April-June	@	@	.06½ @	Ceará, negro heads.....	@	@	@
No. 2 Amber, spot ("B" blanket) .....	.09½ @	.06 @	.05 @	Ceará scrap	@	@	@
August-September .....	.09½ @	.06¼ @	.05 @	Manicoba, 30% guaranteed	†.10 @	†.05 @	†.04 @
October-December .....	.09½ @	.05½ @	.05½ @	Mangabiera, thin sheet....	†.14 @	†.05 @	†.04 @
January-March .....	.09½ @	.06½ @	.05½ @	Guayule			
April-June	@	@	.05½ @	Duro, washed and dried... .	.15 @	.14 @	.14 @
No. 3 Amber, spot ("C" blanket) .....	.08¾ @	.05¾ @	.04¾ @	Ampar .....	.16 @	.15 @	.15 @
No. 1 Brown, clean, light thin .....	.09½ @	.06 @	.05 @	Gutta Percha			
No. 2 Brown, clean, thin.. .	.08¾ @	.05¾ @	.04½ @	Gutta Siak .....	.12¾ @ .13½	.10½ @	.10¾ @
Brown, roll .....	.07¾ @	.05¾ @	.04½ @	Gutta Soh .....	.25 @ .26	.18 @	.16¾ @
East Indian				Red Macassar	2.20 @ 2.95	1.80 @	1.75 @
PONTIANAK				Balata			
Banjerminas .....	.07 @	.06 @	@	Block, Ciudad Bolivar....	.36 @	.27 @	.27 @
Pressed block .....	.12 @ .12½	.09 @	.08½ @	Colombia .....	.36 @ .37	@	@
Sarawak .....	.07 @	.06 @	@	Manaos block .....	.40 @ .41	.28 @	.27 @
South American				Surinam sheet .....	.58 @ .59	.50 @	@
PARAS				Amber .....	.61 @	.52 @	@
Upriver, fine .....	.12¾ @	.08¾ @	.07¼ @				
Upriver, fine	*.16¾ @	*.11 @	*.11 @				
Upriver, coarse .....	.06 @	@	@				
Upriver, coarse	*.10¾ @	*.07½ @	*.07½ @				

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

N. Y. Outside Market

Buyers have been rather active in the outside market during the last month because the low prices have made some attractive purchases possible. While manufacturers bought substantial supplies earlier in the year, they have been using rubber for the last few months so that many are active in the market.

The automobile manufacturing industry was said to be the only major industry to show a gain in employment during June, in a report issued by the Department of Commerce. This has been offset, however, by the curtailed activity in the automobile field. For the last few weeks production has declined sharply, and new car registrations showed a decline for July instead of a seasonal increase. Exports of automobiles also have declined in the first six months of this year.

Tire manufacturers are not producing at an exceptional rate, but it is expected that output for the year will be at least at last year's level if not better.

A sound condition exists in both industries. Stocks of automobiles in the hands of dealers are low, with orders being placed only in response to demand. The same condition is reported in the tire field.

The unsettling factor in the market is the large shipments of rubber that still come from the Far East. Estimates of Malayan shipments for August range from 44,000 to 47,000 tons, far in excess of consumption.

Until the large stocks of rubber on hand stop accumulating in larger figures, the market can expect no better than 5-cent prices. This may be accomplished by the low price of rubber which, it is believed, will force many producers into bankruptcy if it continues.

Week ended August 1. Domestic affairs loomed largest in the news for the week, but the tone was no better than that from foreign centers the week before. The U. S. Steel Corp. reduced its dividend; the stock market was weak; the wheat market is out of sight; and preparations are being made for the relief of the unemployment expected during the Winter.

The market has been listless and dropped to new low levels for the season. Few factory buyers came into the market because the low record reached on Wednesday was pushed down 10 more points on Thursday.

What effect the week-end news will have on the market will not be known until next week since the markets in London and Singapore are closed until Tuesday because of the bank holiday.

The news was the extension of a large credit to England by the central banks of the United States and France, and the proposal of President Hoover that Germany buy our surplus of wheat and cotton on long credit terms.

Exports of crude rubber by the Dutch East Indies during June were 24,317 tons, compared with 25,530 tons during May. Rubber stocks in Colombo on June 30 were reported as 3,518 long tons, compared with 3,857 long tons on March 31, 1931.

Reports continue to come in that estates, both native and European, have closed

A Declaration of Policy

John L. Julian¹

LET us not mince words! The policy of the Rubber Exchange of New York is and has been to provide a hedging market for the manufacturers. The American rubber manufacturer should utilize this hedging market in the future to protect himself from fluctuations in the price of rubber.

If in the future large inventory adjustments offset the efficiency of American manufacturers in the reduction of overhead charges and production costs per unit, it will be because the insurance afforded by the Rubber Exchange has not been utilized.

The business of estimating the future prices of a raw material should be kept distinct from the business of cheaply manufacturing that commodity into useful manufactured goods. Speculation is apart from the realm of manufacturing. Assurance that rubber prices will be stabilized in the future or that violent fluctuations of past years will not be repeated in future years is based on speculative prediction!

The large cotton mills which are and have been operating profitably, have, almost without an exception, been free users of the hedging facilities afforded by the New York Cotton Exchange. The Rubber Exchange of New York offers to the rubber manufacturers the same facilities. During the past year the Exchange commissions have been greatly reduced with a view to encouraging further hedging by manufacturers, and further constructive steps only await the active cooperation of the manufacturing fraternity.

¹ President of the Rubber Exchange of New York.

down, and figures by the Department of Commerce show that the annual production for 1931 has declined from an indicated total of 467,000 tons in March to 453,000 in April and 449,000 in May.

Prices at the close of August 1 were:

Spot	Aug. 1	Month Ago	Year Ago
Crepe	6¼	7¼	10¾
Ribs	5¼	6½	10¾
Upriver fine ..	8½	8¾	13¼

Week ended August 8. Weakness in all the primary markets was reflected in the actual market for rubber. Trading was narrow, with fairly large offerings. Prices eased off steadily, with little support from London or Singapore.

Malayan shipments for July at 43,658 tons were bearish. They compare with 39,397 tons in June and 41,347 in July, 1930. Of this total, 27,645 tons were to the United States and 5,699 tons to the United Kingdom.

Ceylon shipments for July were 4,212 tons, against 5,242 tons in June and 4,070 tons in July, 1930.

July figures make the seventh month that traders were disappointed in their expectations for lower figures from Malaya. With the turn of the year it was thought that the low prices would freeze out the marginal producers and prices would firm up. But month after month has passed; and although reports

of reduced acreage and curtailed activity continue to come in, the rate of shipments holds up.

A survey published by the Standard Statistics Co. of New York estimates that automobile production in the first half of 1931 was 30 per cent lower than in the same period of 1929. Although the survey holds out little hope for improvement in the current year, the long-time outlook is more cheerful.

"Surveying the more distant outlook," says the report, "we feel justified in forecasting that a rather substantial portion of the pent-up demand accumulating during the last year or more of depression will be released in 1932. In short, we preliminarily estimate that sales next year will be at a substantially higher level than those to be recorded in 1931."

Prices at the close of August 8 were:

Spot	Aug. 8	Month Ago	Year Ago
Crepe	5¾	7¼	10¾
Ribs	5¾	6½	10¾
Upriver fine ..	8½	8¾	13¼

Week ended August 15. After reaching a low of 5 cents, rubber firmed up a bit on short covering. Traders came into the market in fair numbers, but buying was mostly for immediate requirements.

Imports of crude rubber during July were 41,004 tons for the United States, compared with a consumption figure of 31,937 tons. Imports were 10.4 per cent less than in June, but 20.3 per cent higher than in July last year. Consumption compared with 29,245 tons in July last year and 37,916 tons in June this year. This report was interpreted bearishly, and the market sold off on receipt of it, but recovered the next day, Friday, when the stock market firmed up.

A definite announcement that all restriction efforts had been abandoned by the Dutch for the present was responsible for the record low level of 5 cents to which the market descended on Monday. It seems that opinion now generally holds that no action at all will be taken by the government concerning restriction, either now or in the future.

Semi-annual figures released by the Department of Commerce show that June production in the United States and Canada was 22 per cent below the preceding month and 27 per cent below last year, while the six months' production was 29 per cent below the first half of 1930. Production so far this year was the smallest for the period since 1922 but was held close to the demand, and the inventory situation is regarded as fairly satisfactory. Employment in the automotive industry declined in June, but the contraction was only slightly greater than seasonal.

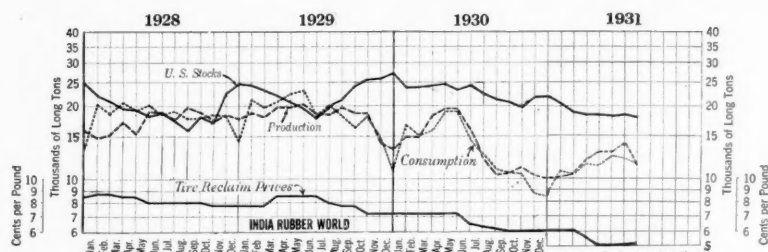
Prices at the close of August 15 were:

Spot	Aug. 15	Month Ago	Year Ago
Crepe	6	6¾	10¾
Ribs	5¾	6¾	10¾
Upriver fine ..	8½	8¾	13¼

Week ended August 22. With record low prices prevailing for the best part of the week, buying was good, and traders reported the sales of a fairly large volume of rubber. Prices were held just above the 5 cent level.

(Continued on page 114)

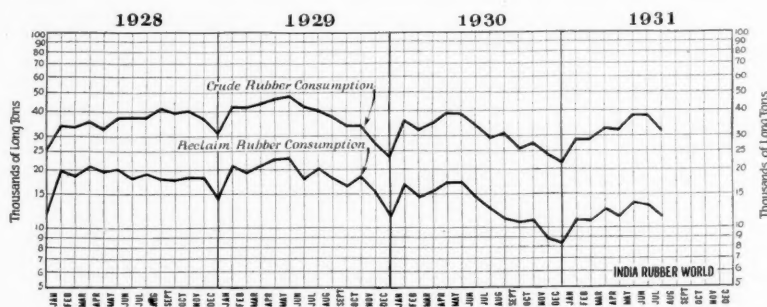
Reclaimed Rubber



Production, Consumption, Stocks, and Price of Tire Reclaim

THE attitude of rubber goods manufacturers toward reclaim is revealed in price and consumption statistics of crude and reclaim. During the past ten months crude rubber prices declined 75 per cent (20 to 5 cents) while auto tire reclaim

The consumption of crude and reclaim increased in parallel ratio since January of this year despite the fact of the rapid convergence of the price of each to the 5-cent level. These facts indicate that reclaim will remain an important factor in



Crude and Reclaimed Rubber Consumption

declined only about 17 per cent (6 to 5 cents). In the same interval the consumption ratio of reclaim to crude slipped back only 10 per cent. Reclaim is thus regarded not as a substitute for crude but is considered and used as an essential ingredient of practical value in many types of rubber mixings.

rubber compounding even though crude should continue to sink still lower in price.

While the field for reclaim in rubber goods manufacture has not narrowed, the demand is reduced in volume but is steady at the low range of current prices. A resumé of orders, for the past month

shows it to be in active request by manufacturers of mechanical rubber goods, tires, red tubes, insulation, carriage cloth and proofing, heels, flooring, molded hose, battery boxes, wringer rolls, footwear, and specialties.

The fact that the ratio percentage of the consumption of reclaim to crude is so well maintained would seem to indicate that the return of better general demand for rubber goods will bring increased activity to the reclaimed rubber industry and a rise in its consumption ratio. That factor alone evidences the value placed on reclaim by rubber goods manufacturers.

The statistical report on reclaims for July shows production 11,393 tons, consumption 11,447 tons, and stock 17,720 tons. These figures are all lower than the corresponding statistics for June, the reductions being on production, 673 tons, consumption 598 tons, and stocks 785 tons.

Reclaim prices show decreases that amount to ¼-cent in some instances and ½-cent in others. The current quotations follow:

New York Quotations

August 27, 1931

High Tensile	Spec. Grav.	Price Per Pound
Super-reclaim, black...	1.20	\$0.06¼ @ \$0.06½
red	1.20	.06 @ .06¼

Auto Tire		
Black	1.21	.04¾ @ .05
Black selected tires...	1.18	.05 @ .05¼
Dark gray	1.35	.06 @ .06¼
White	1.40	.06¾ @ .07

Shoe		
Unwashed	1.60	.05½ @ .05¾
Washed	1.50	.06¼ @ .06¾

Tube		
No. 1	1.00	.07 @ ...
No. 2	1.10	.05¾ @ .06

Truck Tire		
Truck tire, heavy gravity	1.55	.05½ @ .05¾
Truck tire, light gravity	1.40	.05¾ @ .06

Miscellaneous		
Mechanical blends.....	1.60	.04 @ .04½

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	157,967	153,497	41.5	24,008	9,468
1931					
January	13,902	15,766	45.8	24,241	954
February	14,676	14,012	45.5	24,241	1,203
March	16,115	14,669	43.2	24,415	1,048
April	16,511	16,269	43.0	24,592	740
May	16,496	16,411	43.7	23,356	939
June	14,581	13,534	41.6	24,484	641
July	11,411	11,918	42.3	22,477	778
August	11,158	11,321	35.9	21,636	807
September	10,588	10,787	41.4	20,704	656
October	11,437	11,038	39.3	19,912	572
November	10,895	9,075	37.5	22,000	437
December	10,197	8,697	39.3	22,000	693
1931					
January	10,460	11,003	37.6	20,466	649
February	10,871	10,800	37.5	18,878	625
March	12,938	12,524	38.2	18,375	752
April	13,267	11,745	35.2	18,356	577
May	13,478	13,103	34.6	18,088	798
June	14,066	13,045	34.4	18,505	703
July	11,393	11,447	35.8	17,720	414

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

New Uses and Cheap Rubber

A trite remark has been that if rubber only became cheap enough, many new and extensive uses would be made of it. At that rate the recent sagging of the price below 5 cents a pound should have provided a rare incentive for the inventive; but considerable applications of rubber in novel ways do not seem to be materializing. Evidently the supplying of real needs does not seem to be contingent merely on cheap commodities. Thus one of the newer uses of rubber, that of quieting and cushioning automotive and stationary machinery, has been developed to meet transportation and industrial exigencies, and is quite unrelated to prices of crude rubber. Low prices do not always stimulate production. Even more tires were sold when rubber was relatively dear than when marketed as recently at starvation prices.

ULTRAMICRONEX

•

The trend toward this patented
super-quality carbon black is
assuming real proportions

•

In Tires . . . *Superior road wear*

In Footwear . . . *Greater liveliness
and toughness . . .*

In
Conveyor Belts } *That extra measure*
In Tap Soles . . . } *of reinforcement . . .*

In all cases . . . *An important sav-
ing in the cost of acceleration . . .*

•

ULTRAMICRONEX costs more to
start with but this is more than
compensated for by the improved
life and performance of the
finished product

•

BINNEY & SMITH CO.

41 EAST 42nd STREET • NEW YORK, N. Y.

Compounding Ingredients

CONSUMPTION of compounding ingredients is fairly active; and while most of the larger tire manufacturing companies are working at reduced capacity, many of the smaller companies are operating 3 shifts a day, 7 days a week. In most other divisions of the trade production is on a fair tonnage basis. The slackness, however, is greater than seasonal.

Gasoline consumption for several years preceding 1930 gained 10 per cent a year. The gain last year was 5 per cent and that for the current year is proceeding at the rate of last year. This fact indicates continuance of a good rate in tire replacement demand, owing to tire wear.

ACCELERATORS. Business is good in the more popular accelerators particularly in those that are adapted for general com-

pounding as well as for tire compounding.

AGE RESISTERS. The consumption of age resisters is based on the competitive element of durability of rubber goods in service. Their demand is, therefore, closely related to that of accelerators and the subject of vulcanization. The selective use of age resisters is a matter for control laboratories according to the class of goods made and service conditions they are to meet.

CARBON BLACK. The price of carbon black is steady at 3 cents a pound in carload lots f.o.b. Texas. Consumption has been curtailed somewhat by the reduced demand from tire companies.

LITHARGE. Since the latter part of July the demand has been small and price steady, at 6¼ cents a pound.

LITHOPONE. The price holds steady and unchanged. Conditions are seasonally dull and business spotty.

RUBBER SOLVENT. The last of July rubber solvent was steady at 4½ cents a gallon for carload lots. Early in August this price advanced ¼-cent, followed by two successive raises in each of the two succeeding weeks of ½-cent each, bringing the price on August 24 to 5¼ cents a gallon.

SOFTENERS. The leading materials in this essential group: namely, stearic acid, pine tar, degreas, and palm oil are in fairly active consuming demand, and the prices are steady.

ZINC OXIDE. Consumption in the rubber trade is fairly active, and the price is unchanged.

New York Quotations

August 27, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives

Marble flour	ton	\$18.00	@	\$25.00
Pumice stone, p.wd.	lb.	.02½	@	.04
Rottenstone, domestic	ton	23.50	@	28.00
Rottenstone, English	lb.	.03¾	@	
Silica	lb.	.01½	@	.05

Accelerators, Inorganic

Lead, carbonate	lb.	.07¾	@	
red	lb.	.07¾	@	
sublimed blue	lb.	.06¾	@	
sublimed white	lb.	.06¾	@	
super-sublimed white	lb.	.06¾	@	
Lime flour, hydrated	ton	20.00	@	
Litharge, casks	lb.	.06¾	@	
Magnesia, calcined, heavy	lb.	.04	@	
carbonate	lb.	.06	@	.07
Orange mineral A.A.A.	lb.	.09¾	@	

Accelerators, Organic

A-1	lb.	.22	@	.27
A-5-10	lb.	.31	@	.36
A-7	lb.	.55	@	.65
A-11	lb.	.62	@	.75
A-16	lb.	.57	@	.65
A-19	lb.	.58	@	.75
A-32	lb.	.70	@	.75
Accelerator 49	lb.	.35	@	.42
Aldehyde ammonia	lb.	.65	@	.67
Altax	lb.	@	@	
Barak	lb.	@	@	
BLE	lb.	@	@	
Butene	lb.	@	@	
Captax	lb.	@	@	
Crylene	lb.	@	@	
DBA	lb.	@	@	
Di-esterex N	lb.	@	@	
Di-ethyl-amine, 100%	lb.	@	@	
DOTG	lb.	.42	@	.43
DPG	lb.	.30	@	.31
Ethylidine aniline	lb.	.45	@	.46
Formaldehyde aniline an- hydro	lb.	.37½	@	.38½
Grassclerator 808	lb.	@	@	
833	lb.	@	@	
Heptene	lb.	@	@	
base	lb.	@	@	
Hexamethylenetetramine	lb.	.58½	@	.59½
Hydrene	lb.	@	@	
Lead oleate, No. 999	lb.	.13	@	
Witco	lb.	.15	@	
Lithex	lb.	@	@	
Methylene dianiline	lb.	.37½	@	.38½
Monex	lb.	@	@	
Novex	lb.	@	@	
Phenex	lb.	.65	@	.70
Pipsol	lb.	4.00	@	4.50
Plastone	lb.	1.75	@	2.15
R-2	lb.	4.50	@	5.00
R & H 40	lb.	.40	@	.41
50	lb.	.40	@	.41
50-D	lb.	.40	@	.41
397	lb.	.75	@	.76
Retardex	lb.	.50	@	
Safex	lb.	@	@	
SPDX	lb.	.70	@	.75
Super-sulphur No. 1	lb.	@	@	
No. 2	lb.	@	@	
Tensilac 39	lb.	.40	@	.42½
Thermio F	lb.	@	@	
Thiocarbamilid	lb.	.20	@	.22
TMTT	lb.	3.00	@	3.25
Trimene	lb.	@	@	
base	lb.	@	@	

Triphenyl guanidine	lb.	\$0.58	@	\$0.60
Tuads	lb.	@	@	
Uito	lb.	3.00	@	
Ureka	lb.	.70	@	1.00
ZBX	lb.	@	@	
Z-88-P	lb.	.50	@	.60
Zimate	lb.	@	@	

Acids

Acetic 28% (bbls.)	100 lbs.	2.60	@	2.85
glacial (carbonyl)	100 lbs.	9.73	@	9.98
Sulphuric, 66%	ton	15.50	@	

Age Resisters

Age-Rite Gel	lb.	@	@	
powder	lb.	@	@	
resin	lb.	@	@	
white	lb.	@	@	
Albasan	lb.	@	@	
Antox	lb.	@	@	
Oxynone	lb.	.68	@	.90
Resistox	lb.	.54	@	.65
Stabilite	lb.	.57	@	.62
Alba	lb.	.70	@	.75
VGB	lb.	@	@	
Zalba	lb.	@	@	

Alkalies

Caustic soda, 76% solid	100 lbs.	2.60	@	
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Antisun Materials

Heliozone	lb.	@	@	
Sunproof	lb.	@	@	

Binders, Fibrous

Cotton flock, dark	lb.	.09½	@	.12
dyed	lb.	.50	@	.80
white	lb.	.11	@	.17

Colors

BLACK

Bone	lb.	.09	@	
Carbon (see Reenforcers)	lb.	@	@	
Drop (bbls.)	lb.	.05½	@	.17
Lampblack (commercial)	lb.	.07	@	.08

BLUE

Blue toners	lb.	.60	@	3.85
Brilliant blue	lb.	3.50	@	
Prussian	lb.	.35	@	.37
Ultramarine	lb.	.06	@	.30

BROWN

Iron oxide	lb.	@	@	
Mapico	lb.	.17	@	
Sienna, Italian, raw	lb.	.04½	@	.11

GREEN

Brilliant green	lb.	3.50	@	
Chrome, light	lb.	.23	@	.25½
medium	lb.	.26	@	.27½
Chromium oxide	lb.	.25	@	.32
Dark green	lb.	1.30	@	
Green toners	lb.	1.00	@	3.60
Light green	lb.	.70	@	

ORANGE

Cadmium sulphide	lb.	.60	@	.70
Orange lake	lb.	.50	@	
Orange toners	lb.	1.60	@	

ORCHID

Orchid toners	lb.	1.05	@	1.75
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PINK

Pink toners	lb.	1.00	@	1.80
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PURPLE

Permanent purple	lb.	1.80	@	
Purple toners	lb.	.60	@	1.90

RED

Antimony	lb.	.48	@	
Crimson, R. M. P. No. 3	lb.	.52	@	
Sulphur free	lb.	@	@	

7-A	lb.	\$0.35	@	
Z-2	lb.	.20	@	
Cadmium	lb.	@	@	
Chinese red	lb.	.85	@	
Crimson red	lb.	.85	@	
Iron Oxides	lb.	@	@	
bright pure domestic	lb.	.09½	@	.12
bright pure English	lb.	.12	@	
bright reduced English	lb.	.08	@	
bright reduced domestic	lb.	.04	@	.08
Indian (maroon), pure domestic	lb.	.09½	@	.12
Indian (maroon), pure English	lb.	.10	@	
Indian (maroon), reduced English	lb.	.08	@	
Indian (maroon), reduced domestic	lb.	.03	@	.08½
Mapico	lb.	.09	@	
Medium red	lb.	.85	@	
Oximony	lb.	@	@	
Red toners	lb.	.95	@	2.75
Rub-er-red	lb.	.08¾	@	
Scarlet red	lb.	1.50	@	
Spanish red oxide	lb.	.02	@	.02½
Sunburnt red	lb.	.13	@	
Venetian red	lb.	.03	@	

WHITE

Lithopone	lb.	.04¾	@	.05
Albalith	lb.	.04½	@	.05
Azolith	lb.	.04½	@	.05
Cryptone	lb.	.06½	@	.07
Grasselli (50 lb. bags)	lb.	.04½	@	.04¾
(400 lb. bbls.)	lb.	.04¾	@	.05
Titanium oxide, pure	lb.	.20	@	
Titanox "B"	lb.	.06½	@	.07
"C"	lb.	.07	@	.07½

Zinc Oxide

AAA (lead free)	lb.	.06½	@	.07
Azo (factory)	lb.	@	@	
ZZZ (lead free)	lb.	.06½	@	.07
ZZ (lead)	lb.	.06½	@	.06¾
Z (8% lead)	lb.	.06½	@	.06¾
Green seal	lb.	.10¾	@	.107½
Green seal, Anaconda	lb.	.10¾	@	.107½
Kadox, black label	lb.	.10¾	@	.107½
blue label	lb.	.09¾	@	.097½
red label	lb.	.08	@	.08½
Red seal	lb.	.09¾	@	.097½
Red seal, Anaconda	lb.	.09¾	@	.097½
Special	lb.	.07	@	.07½
White seal (bbls.)	lb.	.11½	@	.117½
White seal, Anaconda	lb.	.11½	@	.117½
XX green	lb.	.07	@	.07½
XX red	lb.	.06½	@	.07
Zinc sulphide (bbls.)	lb.	.15	@	.15½

YELLOW

Cadmium sulphide	lb.	.65	@	.75
Chrome	lb.	.16½	@	
Lemon yellow	lb.	1.50	@	
Mapico	lb.	.12	@	
Ochre, domestic	lb.	.01¾	@	.025½
French	lb.	.03	@	
Oxide, pure	lb.	.08½	@	
Yellow toner	lb.	2.50	@	

Deodorant

Rodo	lb.	@	@	
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Factice—See Rubber Substitutes

Fillers, Inert

Asbestine	ton	13.40	@	13.50
Baryta white (f.o.b. St. Louis, bbls.)	ton	23.00	@	

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(f.o.b. St. Louis, 80 lb. paper bags).....ton	\$22.20	@		Rapeseed, blown.....gal.	\$0.70	@	\$0.72	Rubberseed, drums.....lb.	\$0.09	@	\$0.09½
Barytes, white, spot.....ton	32.00	@	33.00	Red oil, distilled.....lb.	.07½	@	.08½	Rubtack.....lb.	.10	@	
off color, spot.....ton	24.00	@	25.00	Rubber process.....gal.	.25	@		Tackol.....lb.	.09	@	.18
Foam "A" (f.o.b. St. Louis).....ton	23.00	@		Spindle.....gal.	.30	@		Tomox.....lb.	.08	@	
Basofor.....lb.		@		Protective Colloids				Witco No. 20.....gal.	.05½	@	
Blanc fixe, dry.....lb.	.04½	@		Bentonite (dispersion clay).....lb.	.03	@		Woburn oil.....lb.	.03½	@	
pulp.....ton	42.50	@	45.00	Casein, domestic.....lb.	.06	@	.07½	Wobonite No. 94.....lb.	.03½	@	
C-C-O white (f.o.b. St. Louis).....ton	15.00	@		Reinforcers				Solvents			
Infusorial earth.....ton	35.00	@		Aluminum flake (sacks, c. l.).....ton	21.85	@		Benzol (90% drums).....gal.	.24	@	
Slate flour, gray (fac'y).....ton	6.00	@		(sacks, l.c.l.).....ton	24.50	@		Carbon bisulphide (drums).....lb.	.05½	@	.12
Suprex white, extra light.....ton	70.00	@	80.00	Carbon Black				tetrachloride (drums).....lb.	.09	@	.09½
Whiting				Aerifloted arrow.....lb.	.03½	@	.07	Dip-Sol.....gal.		@	
Chalk, imported.....100 lbs.	.50	@	1.50	Cabot's certified black.....lb.	.03	@		Dryolene, No. 9.....gal.		@	
Domestic.....100 lbs.	1.00	@		Century (works, La, c. l.).....100 lbs.	3.10	@		Gasoline			
Paris white, English cliffstone.....100 lbs.	1.50	@	3.50	Disperso (works, La, c. l.).....100 lbs.	3.10	@		No. 303			
Quaker.....ton		@		Elastex.....lb.	.03	@	.07	Drums, (c. l.).....gal.	.20	@	
Sussex.....ton		@		Exello.....lb.	.03	@		Tank cars.....gal.	.16	@	
Witco (l. c. l.).....ton		@		Gastex (f. o. b. fac'y) contracts.....lb.	.02½	@		Petrobenzol.....gal.		@	
(f.o.b. New York).....ton	20.00	@		carload.....lb.	.02½	@		Rub-Sol.....gal.		@	
Wood flour.....ton	25.00	@		less carload.....lb.	.03½	@	.04½	Solvent naphtha (tanks).....gal.	.24	@	
Fillers for Pliability				Micronex.....lb.	.03½	@	.07½	Stod-Sol.....gal.		@	
Flex.....lb.		@		Ordinary (compressed or uncompressed).....lb.	.03½	@	.07	Troluol.....gal.		@	
Fumorex.....lb.	.02½	@	.06	Palmer gas black.....lb.	.03	@		Turpentine, Venice.....lb.	.20	@	
P-33.....lb.		@		Supreme.....lb.	.03	@		dest distilled.....gal.	.32	@	.36
Thermax.....lb.		@		Clays				Stabilizers			
Velvetex.....lb.	.02	@	.05	Bento.....lb.	.03	@		Laurex, ton lots.....lb.		@	
Finishes				Blue Ridge, dark.....ton		@		Sta-Tex A.....lb.		@	
Mica, amber.....lb.	.04½	@		China.....lb.	.01½	@		Stearates			
Shellac, fine orange.....lb.	.60	@	2.77	Dixie.....ton		@		Aluminum.....lb.	.26	@	.27
Starch, corn, pwd., 100 lbs. potato.....lb.	.05½	@	.06	Dusto.....lb.	.08	@	.10	Calcium.....lb.	.26	@	.27
Talc, domestic.....lb.	.01½	@	.02	Langford.....ton		@		Magnesium.....lb.	.28	@	.29
dusting.....lb.	.01½	@	.02	Lexo (works).....ton	8.00	@		Zinc.....lb.	.27	@	.28
French.....ton	18.00	@	22.00	Par.....ton		@		Stearic B.....lb.	.08	@	.12
Italian.....lb.	.02¾	@	.03	Perfection.....ton	20.00	@		Stearax flake.....lb.	.09	@	.13
Pyrax A.....ton		@		Suprex No. 1.....ton	8.00	@		Stearic acid, dbl. pres'd.....lb.	.08½	@	.09
Inflating Material				No. 2, dark.....ton	6.50	@		Vulcanizing Ingredients			
Ammonium carb., pwd.....lb.	.10½	@		Glue, high grade.....lb.	.20	@	.25	Sulphur			
lump.....lb.	.10	@		Rubber Substitutes or Factice				Rubber sulphur.....100 lbs.	1.75	@	2.50
Sponge paste.....lb.	.30	@		Amberex.....lb.	.15	@		99½% superfine			
Mineral Rubber				Black.....lb.	.07	@	.11	(c.l.).....100 lbs.	2.20	@	2.55
Fluxrite (solid).....lb.		@		Brown.....lb.	.07	@	.12	(c.l.).....100 lbs.	2.60	@	3.10
Genasco (fact'y).....ton	40.00	@	42.00	Thiokol.....lb.	.30	@		Soft rubber, 100% (c.l.).....100 lbs.	2.60	@	2.95
Gilsonite (fact'y).....ton	37.14	@	39.65	White.....lb.	.08	@	.15	(c.l.).....100 lbs.	2.95	@	3.50
Granulated M. R.....ton		@		Softeners				Sulphur chloride.....lb.	.03½	@	.04
Hydrocarbon, hard.....ton		@		Burgundy pitch.....100 lbs.	6.00	@		Superfine commercial flour (bbls.).....100 lbs.	2.55	@	3.10
Ohmlac Kapak, M. R. (f.o.b. fac'y).....ton	60.00	@		Atlas.....100 lbs.	6.50	@		(bags).....100 lbs.	2.20	@	2.80
M. 4 (f.o.b. fac'y).....ton	175.00	@		Corn oil, crude.....lb.	.07½	@	.08	Tire brand, superfine.....100 lbs.	1.75	@	
Pardura (fact'y).....ton	60.00	@	65.00	Cottonseed oil (P. S. Y.).....lb.	.25	@	.34	Tube brand, velvet.....100 lbs.	2.30	@	
Parmar Grade 1.....ton	23.00	@	28.00	Cycline oil.....lb.	.03½	@	.04½	Velvet flour (240 lb. bbls.).....100 lbs.	2.95	@	3.50
Grade 2.....ton	23.00	@	28.00	Degras.....lb.	18.00	@	80.00	(150 lb. bags).....100 lbs.	2.60	@	3.15
Pioneer, M. R. solid (fact'y).....ton	40.00	@	42.00	Fluxol (fluid).....lb.		@		Telloy.....lb.		@	
M. R. granulated.....ton	50.00	@	52.00	Fluxrite (Lagos).....lb.	.04½	@		Vandex.....lb.		@	
Robertson, M. R., solid (fact'y).....ton	32.00	@	80.00	(Niger).....lb.	.04	@		(See also Colors—Antimony)			
M. R. granulated.....ton	32.00	@	80.00	(Witco).....lb.	.07½	@		Waxes			
Mold Lubricants				Para-flux.....gal.	.15	@		Beeswax, white, com.....lb.	.55	@	
Rusco mold paste.....lb.	.12	@	.30	Petrolatum, snow white.....lb.	.07	@	.07½	carnauba.....lb.	.33	@	
Sericite.....lb.		@		Pigmentar.....gal.	.18	@	.23	ceresin, white.....lb.	.12½	@	
Soapbark (cut).....lb.	.07½	@	.08	Pigmentaroil (tank cars, factory).....gal.	.18	@		montan.....lb.	.06½	@	
Soapstone.....lb.	.01	@	.01½	(bbls., drums).....gal.	.23	@		ozokerite, black.....lb.	.28	@	
Oils				Pine oil, dest. distilled.....gal.	.54	@	.55	green.....lb.	.28	@	
Castor, blown, drums.....lb.	.13¾	@	14	Pine pitch.....bbl.	6.50	@	7.00	Paraffin			
Kerosene.....gal.	.10	@		Pine tar (retort).....gal.	.19	@	.22	127/124 crude, white scale.....lb.	.03¾	@	
Mineral.....gal.	.20	@		Rosin K (280 lbs.).....bbl.	6.15	@		124/126 crude, white scale.....lb.	.03¾	@	
Poppy seed oil.....gal.	1.70	@		Rosin oil, compounded.....lb.	.35	@		scale.....lb.	.03¾	@	
				No. 3, deodorized.....gal.	.57	@		125/127 fully refined.....lb.	.04¾	@	
				No. 556, deodorized.....gal.	.48	@					

Netherlands East Indies Exports

	Long Tons				Jan. to Apr.	
	1931	1931	1931	1931	1930	1931
Java and Madura	5,923	4,869	5,434	6,473	23,207	22,699
Sumatra E. Coast	7,348	7,206	7,104	6,063	27,960	27,721
Other N. E. I.						
Atjeh	270	202	335	324	1,129	1,131
Tapaoeli	417	452	439	368	1,863	1,676
Sumatra W. Coast	87	43	83	33	343	246
Riouw	689	668	792	786	2,655	2,935
Diambi	2,881	2,265	2,751	2,297	9,953	10,194
Palembang	1,466	1,507	1,821	1,001	6,453	5,795
Lamhongsche	255	268	372	286	1,118	1,181
Benkoelen	9	2	4	5	16	20
Banka	9	4	11	11	133	35
Billiton			1		29	1
West Borneo	2,246	1,664	2,232	1,847	10,240	7,989
S. and E. Borneo	1,955	1,572	2,204	1,736	9,784	7,467
Celebes	13	10	9	8	28	40
Menado	17	8	13	18	59	56
Amboina				7	9	7
Riouw (free zone)	467	148	56	177	793	848
Total other N. E. I.	10,781	8,813	11,123	8,904	44,605	39,621
Total N. E. I.	24,052	20,888	23,661	21,440	95,772	90,041

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Shipments—Net Exports

	Long Tons					
	Calendar Years		1931			
	1929	1930	Apr.	May	June	July
British Malaya						
Gross Exports	579,524	547,043	43,353	44,281	39,505	43,658
Imports	161,612	133,876	9,977	10,479	12,115	11,995
Net	417,912	413,167	33,376	33,802	27,390	31,663
Ceylon	80,795	76,406	4,333	4,242	*5,246	*4,212
India and Burma	11,720	10,782	641	622	1,086	.....
Sarawak	11,079	10,310	788	869	1,138	801
British No. Borneo	7,381	7,052	*500	*500	*500	*500
Siam	5,024	4,349	340	413	337	316
Java and Madura	66,010	69,755	6,473	7,372	5,856	.....
Sumatra E. Coast	87,589	79,396	6,063	6,799	6,697	.....
Other N. E. Indies	134,732	115,254	8,759	10,955	11,381	.....
French Indo-China	10,147	9,877	327	*702	*938	*841
Amazon Valley	21,148	14,260	629	1,110	621	565
Other America	996	516	13	6	*5	.....
Guayule	1,275	1,095	320	*300	*300	.....
Africa	4,596	3,961				
Totals	860,404	816,180	62,562	67,692	61,495	.....

*Estimate. Compiled by Rubber Division, Department of Commerce, Washington, D. C.

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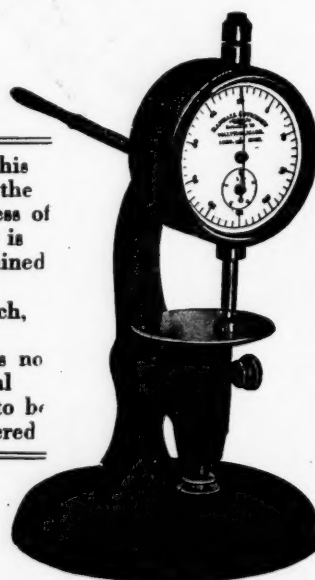
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Cotton and Fabrics

THE government's crop estimate of 15,584,000 bales of cotton in face of private estimates which ranged from 13,500,000 bales to 14,300,000 bales, overshadowed all other developments in the cotton market for the month. The break that followed this estimate sent cotton to the lowest price in 30 years and gave rise to several radical schemes for the alleviation of the cotton farmer's troubles.

One of the most radical, and the one most widely criticized, was that put forth by the Federal Farm Board, which called on the governors of 14 states to assist it in persuading the cotton farmer to plow in every third row of his crop. Comments by some of the governors branded the idea as "ridiculous" and "impossible."

Prior to the government's announcement an offer had been received from Germany for the purchase of cotton at a price below the market on long credit terms. Great criticism from the South arose to this plan; so it was dropped although in the light of later developments it might have been more wisely accepted.

The latest plan was formulated at a gigantic mass meeting called by Governor Stone in the South. Senator Caraway suggested that the Farm Board buy this year's cotton at a price above the market. The farmers would plant no crop next year, and the cotton in the hands of the Board was to be sold for the account of the farmers. China has been reported as offering to buy cotton on long credit for its flood victims.

Undoubtedly the estimate was a severe blow to the industry, and the Farm Board was blamed partly because it was said its price-maintaining activities led the farmers to believe that the board would absorb any surplus. Before a bad situation is made worse, many traders would favor abolishing the Farm Board and its price-fixing activities.

Week ended August 1. New low levels for the season and for a good many years back were reached in the week's trading. The principal cause of the decline was the fact that private estimates forecasted a crop in excess of the one last year. Weather has been favorable, and insect damage for July was negligible.

Another cause of the decline was the weakness engendered in all markets when the United States Steel Corp. cut its dividend and announced a reduction in employees' salaries. December cotton, in response to these unfavorable factors, at one time hit a low of 8.59 cents, which compares with a high of 12.32 cents reached on February 25 of this year.

But although the market saw a week of declining prices, two developments over the week-end may change traders' sentiment. One was the fact that France and the United States, acting jointly, extended a credit of \$225,000,000 to England in an effort to stop the drain of gold from that center. It was the first time that the banks of issue of the United States and France acted together.

The other factor was the suggestion by President Hoover that Germany buy from

COTTON BULL POINTS

1. Prospects of a protective tariff on British goods has stimulated buying in Liverpool.
2. Agitation for the sale of cotton to China on long credit terms has become evident.
3. With such low prices a possibility exists that the farmers will hold part of their crops off the market.
4. The Caraway plan for cessation of planting next year received wide publicity.
5. The tonnage in European cotton mills is slightly better.
6. Federal Farm Board is doing its utmost to give relief to the cotton farmer.
7. The cotton spinning industry operated at 86.3 per cent capacity on a single shift basis during July, compared with 87 per cent in June, and 67.4 per cent in July last year.
8. Stocks of cotton cloth on hand decreased 6.5 per cent during July to a new low record for the period beginning January 1, 1928.

COTTON BEAR POINTS

1. The government estimate of this year's crop, as of August 1, was 15,584,000 bales, compared with 13,932,000 bales last year.
2. The total crop plus carryover this year will be over 24,000,000 bales; consumption last year was about 11,000,000 bales.
3. The yield per acre this year was estimated at 185.8 pounds per acre, against 147.7 pounds last year, and a 10-year average of 154.4 pounds.
4. Stocks of cotton in the United States as of July 31, 1931, totaled 6,369,405 bales, compared with 4,530,429 last year.
5. Cotton prices reached a low that has not been equaled in 30 years.
6. The growth of Russian cotton is an unknown menace.
7. Production of cotton cloth during July was 7.5 per cent less than in June; new orders were 32.2 per cent of production; unfilled orders decreased 16 per cent for the month.
8. Favorable weather conditions continue to help the crop.

us our surplus of wheat and cotton on liberal credit terms. It was felt that Germany might buy cotton, but not wheat, since German farmers were growing much wheat because of the restrictions on imports into that country.

Preliminary figures issued by the New York Cotton Exchange showed that spinners took about 1,776,000 bales less cotton this year than last year, and exports were about 125,000 bales greater. The visible supply of American cotton is 2,160,000 bales larger than a year ago; while the world's visible supply of all kinds aggregates 7,358,000 bales, against 5,408,000 a year ago, and 3,904,000 two years ago.

Prices at the close of August 1 were:

Position	High	Low	Close	Previous Close
Oct.	8.33	8.25	8.25/27	8.36/37
Dec.	8.57	8.45	8.45/48	8.59/60
Jan.	8.67	8.55	8.55/57	8.71
Mar.	8.89	8.76	8.76/79	8.94/96
May	9.04	8.94	8.94/96	9.09/10

Week ended August 8. Estimates by Cotton Exchange members had put the cotton crop at about 13,900,000 bales, but the government report published Saturday revealed an estimate of 15,584,000 bales. It was the most bullish estimate in many years and about 13 per cent above estimates by the Exchange members.

The condition of the crop on August 1 was 74.9 per cent of normal, indicating a yield of 185.8 pounds per acre, compared with a condition of 62.2 per cent a year ago, and a final yield of 147.7 pounds. The 10-year average condition on August 1 was 67.5 per cent, with acre yield averaging 154.4 pounds.

On July 1 this year, 41,491,000 acres

were in cultivation. That area reduced by the 10-year average abandonment between July 1 and time of picking brings the probable area to be picked this year to 40,129,000 acres, on which figure the department based its indicated total production.

The exchanges at New York and New Orleans were closed when the report was issued, and prices in New York gained from 5 to 11 points. In Chicago, where the exchange reopened after publication of the report, prices broke over 1¼ cents a pound, or \$7 a bale.

With a carryover of 9,000,000 bales, and a new yield of 15,584,000 bales, the market will have to overcome an extremely bearish load when trading starts on Monday morning.

The week-end firmness was in response to the report that the government had rejected Germany's counter offer to buy 600,000 to 800,000 bales of cotton on long credit terms. It was thought that the offer was rejected as much because of the protests received from growers as because Germany made a counter offer lower than the price set as a minimum by the Federal Farm Board.

Prices at the close of August 8 were:

Position	High	Low	Close	Previous Close
Oct.	8.22	8.07	8.12/13	8.01/03
Dec.	8.44	8.30	8.31/34	8.24/25
Jan.	8.56	8.40	8.40/45	8.35
Mar.	8.76	8.60	8.62	8.55
May	8.93	8.77	8.82	8.72
July	9.08	8.93	8.98	8.88

Week ended August 15. A drop of \$7 a bale was the market's reaction on Monday morning to the news of the record crop, and final prices for the day were off from 109 to 114 points. The price of cotton fell to the lowest point since 1905; December cotton closed at 8.31 on Saturday, fell 137 points to 6.94, and closed at 7.20 cents.

When reports of a record winter wheat crop were issued, the market dropped further. It seems that the spring crop was small, but the August 1 estimate for the winter crop offset the small early crop, thus adding to the problems of the Farm Board.

The actions of the Farm Board received much attention during the week. Following the announcement of a crop of 15,584,000 bales, and a carryover of 9,000,000 bales, the board made a proposal which, in the eyes of some traders, showed how panicky the board had become. The proposal was that the cotton farmers should plow under one-third of their crops; and the board would promise to withhold the cotton in its possession from the market.

A notice of this plan was sent to fourteen southern governors. Seven of them labeled the idea as foolish and preposterous; three approved the suggestion; and four made no comment.

Despite the opposition to the plan the first reaction was to send the market higher. But when the tenor of the comment was apparent, the market was sent down again.

In an editorial *The New York Times*

said: "In the general opinion . . . this action of the Farm Board is final and conclusive proof that it is moribund and ought quickly and mercifully to be put to death."

The report of the Association of Cotton Textile Merchants of New York showed new business booked during July at 82.2 per cent of production; production was 7.5 per cent less than in June; shipments were 109.8 per cent of production; stocks on hand decreased 6.5 per cent; and unfilled orders on July 1 showed a decrease of 16 per cent during the month. In past years unfilled orders have increased sharply during August and September.

Prices at the close of August 15 were:

Position	High	Low	Close	Previous Close
Oct.	7.25	7.00	7.15/16	7.04/05
Dec.	7.46	7.21	7.37/38	7.23/25
Jan.	7.55	7.33	7.48/50	7.36
Mar.	7.77	7.54	7.68/69	7.54/55
May	7.95	7.72	7.87/88	7.72/74
July	8.08	7.88	8.04	7.88/90

Week ended August 22. The losses in the early part of the week more than offset the slight gains in the latter half. Good weather, with promises that August conditions would be favorable to growth, prompted heavy selling. Before the market recovered on Friday, cotton had dipped to the season's lows: October went to 6.58 cents, and Middling to 6½ cents.

As a result of the Farm Board's efforts to devise a plan to overcome the surplus stocks on hand, Governor Long called a meeting in New Orleans at which more than 1,000 attended to formulate a workable scheme.

The proposal made by Senator Caraway of Arkansas was adopted. The plan was for the Farm Board to purchase 8,000,000 bales of cotton at a price slightly above the market, the cotton to be allocated to those farmers who agree not to plant any cotton next year. The cotton would then be sold at the order of the farmers for their account. If a price of 8 cents were paid for the cotton, it would require \$320,000,000 to buy 8,000,000 bales.

Cotton stocks in the United States on July 31, 1931, amounted to 6,369,405 bales, compared with 4,530,429 last year, according to an announcement by the Bureau of the Census.

Cotton cloth production last week advanced more than seasonally and in the adjusted *Times* index reached 94.0, compared with 90.4 for the week ended August 8 and 76.8 for the week of August 15 last year. Apparently this rate marks the end of curtailment efforts for the present.

The cotton spinning industry operated during July at 86.3 per cent capacity on a single shift basis, compared with 87 per cent in June, and 67.4 per cent in July last year.

Prices at the close of August 22 were:

Position	High	Low	Close	Previous Close
Oct.	6.89	6.73	6.87/89	6.71/72
Dec.	7.10	6.96	7.08/10	6.92/93
Jan.	7.19	7.06	7.18/19	7.01/02
Mar.	7.38	7.23	7.35/38	7.22/23
May	7.59	7.42	7.56/59	7.39
July	7.76	7.61	7.74/76	7.56/57

Firm Liverpool cables and an active covering movement were responsible for a spurt in the market on August 24 that

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Aug. 1	8.45
Aug. 8	8.03
Aug. 15	6.92
Aug. 22	6.69

sent prices up ¼-cent. The political situation in London led to the hope that a higher tariff would be put through, so heavy buying resulted. Almost 100,000 bales were taken by a few brokers from the ring. The ginnings report showed only 90,000 bales this season, compared with 573,000 last year.

After selling off about 22 points on August 25 prices recovered and closed about 8 points lower. It was a local affair.

On August 26 spot middlings closed at 7.20, an advance of 20 points over the day previous. The market was barely steady. The day's quotations were as follows:

Position	High	Low	Close	Previous Close
Sept.	7.18	6.95	7.01	6.83
Oct.	7.18	6.95	7.16	6.98
Dec.	7.40	7.16	7.36	7.20
Jan.	7.50	7.27	7.46	7.29
Mar.	7.68	7.45	7.64	7.40
May	7.87	7.63	7.82	7.66

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. During the past month prices declined in keeping with the government cotton report of August 8. Rubber manufacturers are believed to be low in their inventories of cotton goods supplies and free from contracts. It, therefore, seems probable that before long they will be in the market for cotton fabrics. All cotton goods are selling at a very close margin at below parity with the price of raw cotton.

RAINCOAT FABRICS. The raincoat business has improved slightly in the past month, but like many other lines the product is being sold below cost. As this is the best season of the year for the raincoat trade, improved demand is expected shortly.

SHEETINGS. Goods are selling very close to cost or even below that level. The demand from the rubber industry like that in other fields is only fair, although steady.

TIRE FABRICS. Prices are based on the present new low cotton market for the various constructions of cord, chafer, builder, and leno breaker fabrics. The market has been quiet and prices steady the past month because of the cautionary reduction of output by the larger tire companies.

Celanese

Practically all celanese fabrics lend themselves readily to rubberizing, but there are a few that have been taken up by the trade for manufacture into raincoats and other articles. The fabrics that appear to be most popular for this use are: celanese permanent moire, celanese faille, celanese taffeta (various constructions).

Celanese permanent moire has, perhaps, been the most popular fabric for raincoat manufacture. Besides its beauty, this fabric is ideal for this use as the moire markings are permanent and will not come out if the fabric is subjected to water or dampness.

New York Quotations

August 27, 1931

Drills

38-inch 2.00-yard	yd.	\$0.10 @
40-inch 3.47-yard .....		.05¼ @
50-inch 1.52-yard .....		.13½ @
52-inch 1.90-yard .....		.10¾ @
52-inch 2.20-yard .....		.09¾ @
52-inch 1.85-yard .....		.11½ @

Ducks

38-inch 2.00-yd. D. F.	yd.	.10 @
40-inch 1.45-yd. S. F. ....		.14½ @
72-inch 1.05-yd. D. F. ....		.21 @
72-inch 16.66-ounce23½ @
72-inch 17.21-ounce24¼ @

MECHANICAL

Hose and belting	lb.	.21½ @
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TENNIS

52-inch 1.35-yard	yd.	.16 @
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Hollands

RED SEAL

36-inch	yd.	.12½ @
40-inch13 @
50-inch19 @

GOLD SEAL

40-inch, No. 72	yd.	.15 @
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Osnaburgs

40-inch 2.35-yard	yd.	\$0.08¼ @
40-inch 2.48-yard08¼ @
40-inch 3.00-yard06¾ @
40-inch 10-oz. part waste ..		.10 @
40-inch 7-oz. ....		.06¾ @
37-inch 2.42-yard .....		.08¼ @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yd.	.08¼ @
Bombazine 60 x 48 .....		.08¼ @
Plaids 60 x 48 .....		.10¼ @
Plaids 48 x 48 .....		.09¾ @
Surface prints 64 x 60 .....		.11¼ @
Surface prints 60 x 48 .....		.10¼ @
Print cloth, 38½-in., 60 x 48		.03¼ @
Print cloth, 38½-in., 64 x 60		.04¼ @

CELANESE

Permanent Moire	yd.	.90 @
Faille .....		.80 @
Taffeta, 84 x 60 .....		.42½ @ .45
Taffeta, 104 x 76 .....		.52½ @ .55
Taffeta, 200 x 64 .....		.82½ @ .85

SHEETINGS, 40-INCH

48 x 48, 2.50-yard	yd.	.06¼ @
48 x 48, 2.85-yard .....		.05½ @
64 x 68, 3.15-yard .....		.06¼ @
56 x 60, 3.60-yard .....		.05½ @
44 x 48, 3.75-yard .....		.04¾ @
44 x 40, 4.25-yard .....		.04 @

SHEETINGS, 36-INCH

48 x 48, 5.00-yard	yd.	.03¼ @
44 x 40, 6.15-yard .....		.03¼ @

Tire Fabrics

CHAFFER

14 oz. 60" 20/8 ply Karded peeler	lb.	.25 @
14 oz. 60" 10/4 ply Karded peeler .....		.21 @
9½ oz. 60" 20/4 ply Karded peeler .....		.27 @
9½ oz. 60" 10/2 ply Karded peeler .....		.23 @

BUILDER

17½ oz. 60" 23/11 ply Karded peeler	lb.	.25 @
17½ oz. 60" 10/5 ply Karded peeler .....		.23 @

LENO BREAKER

8½ oz. 60" and 10½ oz. 60" Karded peeler	lb.	.25 @
--	-----	-------

CORD FABRICS

23/5/3 Karded peeler, 1½" cotton	lb.	.25 @
23/4/3 Karded peeler, 1½" cotton .....		.27 @
15/3/3 Karded peeler, 1½" cotton .....		.23 @
13/3/3 Karded peeler, 1½" cotton .....		.22 @
7/2/2 Karded peeler, 1½" cotton .....		.22 @
23/5/3 Karded peeler, 1½" cotton .....		.30 @
23/5/3 Karded Egyptian, Egyptian uppers cotton ..	lb.	.37 @
23/5/3 Combed Egyptian ..	lb.	.43 @



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Ducks

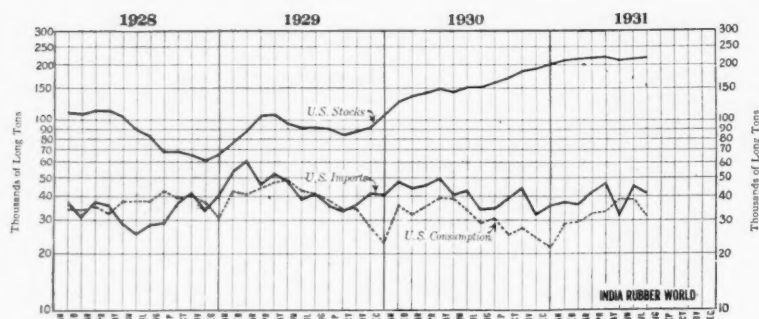
Drills

Selected

Osnaburgs

Curran & Barry
320 BROADWAY
NEW YORK

Imports, Consumption, and Stocks



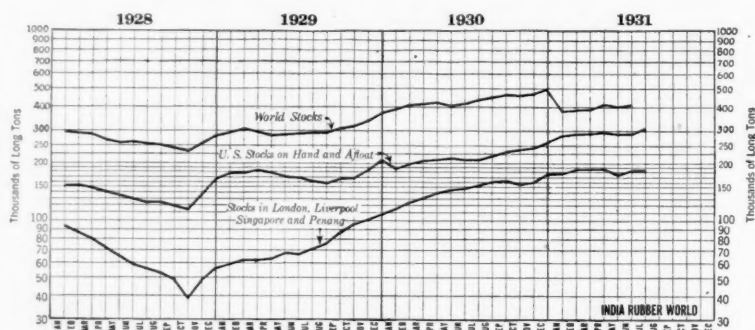
United States Stocks, Imports, and Consumption

JULY consumption of crude rubber by domestic rubber manufacturers is estimated at 31,937 long tons, a drop of 5,979 tons from the amount consumed in June. The decrease was owing chiefly to curtailed tire output by the larger companies.

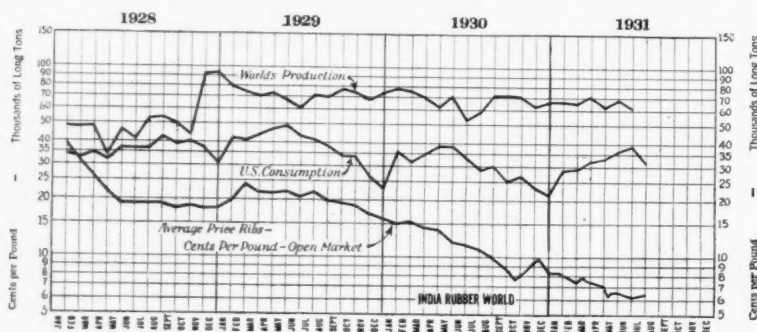
Imports of crude for July amounted to 41,004 tons, a reduction of 4,772 tons below the June imports. Even at that the July imports were 9,067 tons more than the July consumption.

Crude rubber afloat to United States ports on July 31 amounted to 66,873 tons or 2,548 less than on June 30.

The net result on stocks on hand in the United States was to increase that item to 234,822 tons, or practically a year's nor-



World, United States, London, Liverpool, Singapore and Penang Stocks



World's Production, U. S. Consumption, and Price of Ribs

mal supply. The total world's rubber stocks as of June 30 are estimated by W. H. Rickinson & Son at 408,343 long tons.

Dutch Production

It is noteworthy that a production above 15,000 tons was attained in three months of 1930, and only in five months (including May) was it under 14,000 tons. Production in 1930 increased by 6,000 tons, despite the May tapping holiday.

Comparable figures for the first three months of 1931 are estimated as follows, the March figure (preliminary) appearing abnormally high: January, 14,700 metric tons; February, 12,490 tons; March, 14,850 tons.

Assuming that this production represented the same proportion of the year's total as in the preceding three years, Dutch estates during the first quarter were producing at an annual rate of 179,500 metric tons. The figures for the first two months alone, however, indicate an annual production rate of 165,500 metric tons on the same basis.

The August weekly records of London and Liverpool stocks to the week ending the 22nd are as follows:

Week Ended	Stock—Tons	
	London	Liverpool
Aug. 1	81,335	54,881
Aug. 8	81,711	55,336
Aug. 15	82,171	54,906
Aug. 22	81,751	54,722

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

	U. S. Net Imports*	U. S. Consumption	U. S. Stocks on Hand†	U. S. Stocks Afloat†	United Kingdom Stocks†	Singapore and Penang Stocks, Etc.†	World Production (Net Exports)†	World Consumption Estimated†	World Stocks—U. S. A., U. K., Singapore, and Penang†
Twelve Months									
1925	384,837	384,644	50,985	52,421	6,328	18,840	527,600	553,300	180,850
1926	411,962	358,415	72,510	51,238	51,320	26,443	621,900	542,000	273,060
1927	431,807	372,528	100,130	47,938	66,261	25,798	607,300	593,866	298,780
1928	446,421	442,227	66,166	68,764	22,603	32,905	653,837	686,945	284,198
1929	561,454	466,475	105,138	62,389	73,253	35,548	860,404	804,820	371,425
1930	488,343	375,980	200,998	56,035	120,575	46,003	815,835	702,935	492,165
1931									
January	37,098	28,557	209,487	56,188	124,336	48,306	65,714	49,620	382,129
February	36,645	28,797	212,834	63,680	126,874	48,164	65,719	59,970	387,872
March	40,338	32,788	218,317	63,133	133,013	48,300	71,218	59,980	399,630
April	46,648	33,321	228,383	56,700	138,144	44,857	63,395	51,200	411,384
May	31,720	37,817	220,799	73,564	138,545	43,212	68,628	63,190	402,936
June	45,776	37,916	225,536	69,421	136,233	46,573	62,090	64,050	408,343
July	41,004	31,937	234,822	66,873	137,047	.....	.....	.....	.....

*Including liquid latex, but not guayule.

†Stocks on hand the last of the month or year.

‡W. H. Rickinson & Son's 1931 figures.

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Rubber Scrap

IN the rubber scrap market no apparent revival of interest has occurred during the past month. Collections of all grades were fair. Scrap business is dull and seasonal with reclaimers fairly well stocked for fall business. Improved conditions are, however, expected shortly to succeed the seasonal dullness. Reduced activity in collections and the decline in scrap prices are in sympathy with the dullness of general business.

BOOTS AND SHOES. A fair supply is available but adequate for the fair consuming demand. The market quotations on all grades remain unchanged from those of a month ago.

INNER TUBES. Collections are light. The market has declined and the low prices serve to induce dealers to stock a liberal tonnage of inner tubes for an advance. In such cases the investment involved in large inventories is not excessive. No. 2 compounded and red tubes have advanced.

TIRES. The demand is good, but tire collections are not heavy. The business is distinctly hampered because of irrational freight rates. Stocks held in important centers are released for nearby reclaiming at \$3.50 to \$4 per ton, but even at that level freight rates interfere with handling scrap tires profitably. Quotations on most grades have declined slightly.

Falling off in consuming demand for solid tire grades on the part of reclaimers caused a decline of \$1.50 per ton in the clean mixed grade, but no decline took place in the light gravity grade. Both grades of solids are gradually becoming extinct as the result of legislation against them because they cause too great damage to the roads.

MECHANICALS. All grades are dull. Prices are unchanged on all grades except No. 1 Red, which is down $\frac{1}{8}$ -cent, and No. 2 Red, which advanced $\frac{1}{8}$ -cent.

HARD RUBBER. Prime quality is scarce and becoming extinct. The price has advanced $\frac{1}{2}$ -cent from $\frac{3}{4}$ cents.

CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

August 27, 1931

Boots and Shoes		Prices	
Boots and shoes, black, 100 lb.	\$0.875	@	\$1.00
Colored 100 lb.	.625	@	.75
Untrimmed arctics. . . 100 lb.	.625	@	.75
Tennis shoes and soles. 100 lb.	.50	@	.60
Inner Tubes			
No. 1, floating lb.	.0334	@	.04
No. 2, compound. lb.	.0174	@	.02
Red lb.	.0134	@	.0174
Mixed tubes lb.	.0174	@	.0134
Tires			
Pneumatic Standard			
Mixed auto tires with beads ton	9.25	@	9.50
Beadless ton	13.50	@	13.75
Auto tire carcasses. . . ton	12.00	@	12.50
Black auto peelings. . . ton	19.50	@	20.00
Solid			
Clean mixed truck. . . ton	22.50	@	23.00
Light gravity ton	31.00	@	32.00
Mechanicals			
Mixed black scrap lb.	.0034	@	.0034
Hose, air brake. ton	8.00	@	9.00
Garden, rubber covered. lb.	.0034	@	.0034
Steam and water, soft. lb.	.0034	@	.0034
No. 1 red lb.	.0134	@	.0174
No. 2 red lb.	.01	@	.0134
White druggists' sundries lb.	.0134	@	.0134
Mechanical lb.	.01	@	.0134
Hard Rubber			
No. 1 hard rubber lb.	.0834	@	.09

N. Y. Outside Market

(Continued from page 102)

Another restriction scheme, this time from the Ceylon Government, gave strength to the market for a time, but selling in London and weakness of the stock markets erased the gain.

Now that the low prices have made growers almost desperate, and many faced with failure, there might be a chance for agreement on restriction.

The estimates of large Malayan shipments for August was another overburdening factor on the market since predictions were for exports of from 44,000 to 47,000 tons, far in excess of requirements. London and Liverpool stocks increased for two weeks straight, with totals now at 137,077 tons, compared with 109,272 tons at the same time last year.

A report by the Department of Commerce on August 14 stated that world stocks have been reduced to a fairly satisfactory level, with the majority of dealers buying on a month-to-month basis.

Prices at the close of August 22 were:

	Aug. 22	Month Ago	Year Ago
Snot			
Crepe	55 1/2	6 1/4	10 3/4
Ribs	5 1/2	6 1/4	9 1/2
Upriver fine	7 3/4	8 1/4	13 1/4

Buying was fairly active in the market on August 24, with prices holding to a narrow range. London stocks were reduced by 700 tons in the last week. On the 25th prices hovered between $5\frac{1}{4}$ and $5\frac{1}{4}$, with light inquiries. On August 26 actuals were inactive and down to $5\frac{1}{16}$ cents, with very little buying in progress.

Price Differentials

Price differentials between the various grades of plantation rubber which shall prevail on all deliveries against new "A" contracts, for September, 1931 are: No. 2 crepe (thick or thin) at 10 points; No. 2 ribbed smoked sheets at 9 points; No. 3 ribbed smoked sheets at 20 points; No. 4 ribbed smoked sheets at 30 points; No. 5 ribbed smoked sheets at 50 points; limit of allowance on No. 2 crepe at 25 points; allowance on rubber delivered in bales at 13 points.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	INQUIRY
1395	Manufacturer of sheeted rubber stock with burlap calendered on both sides.
1396	Source of supply of carbon disulphide.
1397	Manufacturer of solid rubber balls.
1398	Source of supply of liquid latex.
1399	Manufacturer of rubberized silk.
1400	Source of supply of a rubber composition bottom and top for golf bags.
1401	Source of supply of sprayed latex.
1402	Maker of "Sisseron," a new insulating material.
1403	Manufacturer of water expeller for reclaimed rubber.
1404	Manufacturer of machinery for making women's wooden heels.
1405	Manufacturer of a mixer with a motor operated knife.
1406	Source of supply of latex paste for making small casts for molded novelties.
1407	Manufacturers of sponge rubber in molds.
1408	Manufacturer of rubber sash filler strips for automobile bodies.
1409	Supplier of ceresin wax.
1410	Manufacturer of golf driving mats.
1411	Manufacturer of narrow rubber covered wire suitable for tails of toy animals.

Poland

Poland's imports of rubber and rubber goods during 1930 came to 5,729,895 kilos, value, 39,616,635 zloty. Of this, crude rubber imports accounted for 2,640,334 kilos, value, 9,987,903 zloty. Most of the crude rubber and other raw materials, as balata and gutta percha, besides waste rubber, reached Poland via Germany. This system probably explains why in the final table showing the extent to which individual countries participated in Poland's rubber import business, Germany ranks second after Great Britain in regard to quantity, but is only fourth, after United States and Soviet Russia, also, in value of imports.

The most important imports were tires, tubes, shoes, and galoshes. The United States and England, in the order mentioned, were the chief sources of supply for tires, America supplying 559,032 kilos, value, 5,242,006 zloty, out of a total of 1,322,311 kilos, value, 11,883,738 zloty; and England, 455,462 kilos, value, 3,472,441 zloty. Of other pneumatic tires, totaling 297,083 kilos, value, 2,569,222 zloty, England supplied by far the greatest amount. England also was the chief source for the inner tubes of all kinds, which came to 214,393 kilos, value, 2,136,795 zloty.

As to shoes, Czechoslovakia supplied about three-fourths of the total 23,477 kilos, value, 600,228 zloty; but Soviet Russia got by far the greatest share of the business in rubber galoshes, that is 291,915 kilos, value, 5,223,339 zloty, of a total 339,421 kilos, value, 6,193,232 zloty. Latvia sent 26,833 kilos, value, 461,446 zloty. Austria, Germany, and the United States obtained the chief share of the imports of soft rubber goods, the total of which was 140,715 kilos, value, 2,655,883 zloty. The lesser imports included belting, 3,438 kilos, value, 51,995 zloty, most of which came from America; balls, 3,719 kilos, value, 104,856 zloty, chiefly from England; rubberized fabric for card clothing, 16,917 kilos, value, 270,111 zloty, supplied by England and France.

The chief exports were rubber shoes and galoshes, which seem to find markets practically all over Europe as well as in Syria and Egypt. The total for shoes was 899,352 kilos, value, 7,495,433 zloty, and for galoshes 499,581 kilos, value, 6,288,466 zloty. Another item of export, of considerably less importance, but also apparently locally manufactured, is hospital sheeting, of which 2,207 kilos, value, 13,693 zloty, were shipped out of the country.

Spring Shackles

No great change has occurred in the proportions of spring shackles of the various sorts in the 1931 cars. Rubber shackles are found on 30 chassis models, 13 of them being of the block type, 10 rubber bushings, 3 of the rubber-fabric type, and 4 of miscellaneous bushed types. Self-adjusting metal shackles of a single make are found on 24 chassis, 4 have ball-bearing shackles and the remaining 20 models are fitted with conventional metal shackles. From an Indiana Section Meeting paper by D. G. Roos, chief engineer of the Studebaker Corp. of America.

CLASSIFIED ADVERTISEMENTS

SITUATIONS WANTED

MANAGER OF DEPARTMENT MANUFACTURING COMPRESSED asbestos sheet packing, asbestos high pressure packings, desires to make change. Ten years' experience. University graduate. Address Box No. 11,016, care of INDIA RUBBER WORLD.

FACTORY SUPERINTENDENT OR DEPARTMENT SUPERINTENDENT available for immediate connection. Years of practical experience and thorough training gives him complete background. Especially valuable in rubberizing and calendering, mill room, curing, and compounding. Will accept moderate salary to start where good future is offered. Will go anywhere. Best of references. Address Box No. 11,017, care of INDIA RUBBER WORLD.

TECHNICAL SUPERINTENDENT—PROCESS DEVELOPMENT. Chemist compounder with eight years' varied experience hard and soft rubber, miscellaneous molded, hose, flooring, dipped goods, etc. Employed at present. Address Box No. 11,022, care of INDIA RUBBER WORLD.

ASSISTANT SUPERINTENDENT OR FOREMAN, EXPERIENCED in mechanical goods, calender, mill, and press room. Knows principles of compounding. Wants position with reliable and progressive company. Now employed. Address Box No. 11,023, care of INDIA RUBBER WORLD.

WORLD WAR VETERAN, WHO HAS HELD RESPONSIBLE POSITIONS in the rubber industry for many years, open for an immediate connection with small concern desirous of expanding. Will handle compounding and factory production. Experience covers mechanical goods, sport soles, shoe findings, steam packing, oil proof packing, sponge products. Have affiliations for unlimited expansion. A-1 references. Address Box No. 11,028, care of INDIA RUBBER WORLD.

RUBBER CHEMIST OR ASSISTANT SUPERINTENDENT, WITH years of practical experience here and abroad, is looking for a new permanent connection. Familiar with laboratory research, development, and factory control work. Experienced in the manufacture of tires, tubes, hose, druggists' sundries, coated fabrics, and the application of latex in dipped goods. Very best references. Address Box No. 11,030, care of INDIA RUBBER WORLD.

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Producers of Dies for Embossing Rubber Soles—Outsole Medallions—Size and Width Stamps—Ankle Patch Dies—Stamping Dies for all kinds of rubber products.

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MOLDS, CORES AND RUBBER MACHINERY
HEATER PRESSES, ENGRAVING MACHINES
WATCH CASE HEATERS, RETREAD EQUIPMENT

MECHANICAL MOLDED RUBBER GOODS

We Solicit Your Inquiries

THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

SITUATIONS WANTED

RUBBER CHEMIST, UNIVERSITY GRADUATE, WITH EIGHTEEN years' practical experience in the rubber industry is looking for new permanent connection. Familiar with laboratory research, development and factory control work, with compounding problems and stock handling from milling to vulcanizing in the manufacture of tires, tubes, cables, mechanical soft and hard rubber, dipped goods, and specialties. Age forty-three, married. Best references. Address Box No. 11,033, care of INDIA RUBBER WORLD.

SITUATIONS OPEN

WANTED: A MAN FOR TECHNICAL SALES WORK FOR Atlantic Coast territory. Must have technical training and rubber experience. Concern established with full line of specialties and compounding materials for rubber manufacturing. Reply by letter giving full information. Address Box No. 11,021, care of INDIA RUBBER WORLD.

WANTED: FOREMAN OF HOSE DEPARTMENT. EXPERIENCED in braided, wrapped, and cotton rubber lined hose. Capable of taking charge of large hose department and familiar with various types of lead presses. Give full particulars when replying, including references. Address Box No. 11,027, care of INDIA RUBBER WORLD.

SUPERINTENDENT WANTED: PRACTICAL MAN, WITH THOROUGH knowledge of manufacturing offset and newspaper blankets. Excellent position for man who is capable of installing plant, knows buying sources, formulas, and is familiar with all the details of the process. No others need apply. Our men know about this ad. Address Box No. 11,029, care of INDIA RUBBER WORLD.

CHEMIST, WITH EXPERIENCE IN CELLULOSE, PYROXYLIN, and artificial leather coatings. Must know cellulose compounds and be able to match colors rapidly. Address Box No. 11,031, care of INDIA RUBBER WORLD.

WANTED: YOUNG MAN EXPERIENCED IN THE SALE OF molded and extruded rubber parts to manufacturers. Must be capable of handling mail sales, familiar with outlets, and follow production. Excellent opportunity for right man to grow with new department. Address Box No. 11,034, care of INDIA RUBBER WORLD.

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any diameter, any length.

The W. F. Gammeter Co.
Cadiz, Ohio

I. T. GURMAN CONSULTING CHEMICAL ENGINEER Golf Ball Specialist

PLANT LAYOUT	OPERATION	EQUIPMENT	FORMULAS
INSTALLATION	COSTS	PROCESSES	ESTIMATES
64 FAULKNER STREET		MALDEN, MASS.	

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SOLE PRODUCERS

ASBESTINE

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Principal Rubber Stocks

	Long Tons—1931					
	Feb.	Mar.	Apr.	May	June	July
Malay Estates	25,056	22,492	21,406	21,901	22,101
S. S. Dealers	42,986	44,317	41,456	40,069	42,066	.....
Other Malay Dealers	17,971	17,735	15,697	15,270	16,647	.....
Malayan Ports	5,178	3,983	3,401	3,143	5,915	.....
Totals	91,191	88,527	81,960	80,383	86,729	.....
London	82,265	84,736	86,982	86,726	*82,345	*81,370
Liverpool	44,656	49,094	51,879	53,668	*54,300	*54,800
Totals	126,921	133,830	138,861	140,394	*136,645	*136,170
U. S. Inventory	210,611	215,523	224,211	219,405	225,346	.....
U. S. Afloat	63,680	63,133	56,700	73,564	69,421	66,873
Europe Afloat	24,580	21,490	18,500	17,770	*17,500	.....
Totals	88,260	85,123	75,200	91,334	*86,921	.....
Grand totals	516,983	523,003	520,232	531,516	*535,641	.....

*Estimate.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for July, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham
July, 1931

To	Sheet and Crepe Rubber		Latex Concentrated Latex and Revertex	
	Tons	Tons	Tons	Tons
United Kingdom	5,699	83	.....	.....
United States	27,645	83	.....	.....
Continent of Europe	5,495	20	.....	.....
British possessions	592	..	.....	.....
Japan	3,424	3	.....	.....
Other countries	666	..	.....	.....
Totals	43,521	137	.....	.....

Rubber Imports

Actual Imports by Land and Sea

From	Dry Rubber		Wet Rubber	
	Tons	Tons	Tons	Tons
Sumatra	584	5,818	.....	.....
Dutch Borneo	542	3,279	.....	.....
Java and other Dutch Islands	28	15	.....	.....
Sarawak	755	46	.....	.....
British Borneo	165	24	.....	.....
Burma	107	15	.....	.....
Siam	146	170	.....	.....
French Indo-China	211	11	.....	.....
Other countries	70	9	.....	.....
Totals	2,608	9,387	.....	.....

Low and High New York Spot Prices

	1931*	August 1930	1929
PLANTATIONS			
Thin latex crepe	\$0.05¼ @ \$0.06¼	\$0.10¼ @ \$0.107½	\$0.207½ @ \$0.22¾
Smoked sheet, ribbed .....	.05¼ @ .05¾	.09¾ @ .10¾	.197½ @ .21¾
PARAS			
Upriver fine .....	.07¼ @ .08¾	.13 @ .13¾	.21¾ @ .22¾
Upriver coarse	Nominal	.06¼ @ ..	.11¼ @ .12¼
Upper caucho ball	Nominal	.06 @ .06¾	.11¼ @ .12¼

*Figured to August 25, 1931.

London Stocks, June, 1931

	Stocks June 30			
	Landed Tons	De-livered Tons	1931 Tons	1930 Tons
LONDON				
Plantation	4,307	7,791	83,000	80,144
Other grades .....	.....	27	34	54
LIVERPOOL				
Plantation	*3,664	*3,330	*53,975	*27,332
Total tons, London and Liverpool	7,971	11,148	137,009	107,530

*Official returns from the recognized public warehouses.

World Rubber Absorption—Net Imports

	Long Tons				
	Calendar Years		1931		
	1929	1930	Apr.	May	June
CONSUMPTION					
United States	472,000	376,107	33,613	38,149	38,249
United Kingdom	72,023	74,760	4,409	5,679	8,957
NET IMPORTS					
Australia	15,886	5,354	457	884	1,112
Austria	3,324	2,365	293	299	143
Belgium	9,445	10,740	515	1,153	.....
Canada	35,453	28,793	2,070	2,748	2,112
Czechoslovakia	4,650	4,532	324	711	.....
Denmark	799	1,147	107	107	.....
Finland	976	1,262	134	29	49
France	59,342	68,503	4,346	2,880	4,002
Germany	49,078	45,488	3,054	3,231	3,504
Italy	17,169	18,570	528	1,023	.....
Japan	34,284	32,731	3,478	3,755	2,988
Netherlands	3,022	2,924	333	86	272
Norway	813	1,143	39	88	.....
Russia	12,626	16,229	1,450	1,034	.....
Spain	2,400	2,400	208	180	207
Sweden	3,857	4,414	215	271	385
Switzerland	653	808	80	60	53
Others estimated†	7,000	7,200	*600	*600	*600
Totals	804,800	705,470	56,253	62,967	.....
Minus United States (Cons.)	472,000	376,107	33,613	38,149	38,249
Total foreign	332,800	329,363	22,640	24,818	.....

*Estimate to complete table. †Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Tire Production Statistics

Pneumatic Casings—All Types

	In-ventory	Produc-tion	Total Shipments
1928	10,217,708	58,457,873	55,721,347
1929	9,470,368	54,980,672	55,515,884
1930	7,202,750	40,772,378	42,913,108
1931			
January	7,165,846	2,939,702	2,995,479
February	7,628,520	3,188,274	2,721,347
March	8,011,592	3,730,061	3,297,225
April	8,025,135	3,955,491	3,945,525
May	8,249,856	4,543,003	4,332,137
June	8,357,768	4,537,970	4,457,509

Inner Tubes—All Types

	In-ventory	Produc-tion	Total Shipments
1928	12,087,464	60,131,381	57,845,189
1929	10,245,365	55,062,886	56,473,303
1930	7,999,477	41,936,029	43,952,139
1931			
January	7,551,503	2,898,405	3,249,734
February	7,936,773	3,132,770	2,720,135
March	8,379,974	3,559,644	3,031,279
April	8,330,155	3,693,222	3,708,949
May	8,438,799	4,329,731	4,224,594
June	8,403,401	4,286,467	4,317,543

Solid and Cushion Tires

	In-ventory	Produc-tion	Total Shipments
1928	152,120	508,223	512,602
1929	122,200	407,347	436,027
1930	75,871	204,340	250,635
1931			
January	75,205	12,631	13,072
February	73,338	11,358	12,915
March	68,584	11,424	16,152
April	64,369	11,610	15,445
May	61,272	11,369	15,566
June	57,462	11,764	15,364

Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires

	Cotton Fabric Pounds		Crude Rubber Pounds		Consumption of Motor Gasoline (100%) Gallons
	1928	1929	1928	1929	
1928	222,243,398	208,824,653	600,423,401	598,994,708	13,633,452,000
1929	208,824,653	180,097,764	598,994,708	53,417,709	14,748,552,000
1930	158,812,462	17,084,749	476,755,707	51,279,827	16,200,894,000
1931					
January	12,738,467	36,318,980	1,127,532,000	.....	.....
February	12,002,161	36,651,119	1,097,208,000	.....	.....
March	14,040,803	41,850,638	1,303,302,000	.....	.....
April	15,243,625	45,016,344	1,402,800,000	.....	.....
May	18,009,764	53,417,709	1,499,904,000	.....	.....
June	17,084,749	51,279,827	1,611,540,000	.....	.....

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

United States Statistics

Imports of Crude and Manufactured Rubber

	May, 1931		Five Months Ended May, 1931	
UNMANUFACTURED—Free	Pounds	Value	Pounds	Value
Crude rubber	79,578,371	\$5,886,638	427,321,709	\$34,711,644
Liquid latex	712,404	82,202	3,906,552	391,532
Jelutong or pontianak	457,338	36,086	5,311,035	477,195
Balata	268,522	44,025	1,046,920	182,548
Gutta percha	51,662	5,424	176,636	19,752
Guayule	.....	.....	.....	.....
Siak, scrap, and reclaimed	1,085,978	5,252	3,906,919	42,527
Totals	82,154,275	\$6,059,627	441,669,771	\$35,825,198
Chicle	Dutiable			
Chicle, crude	Free	686,784	\$332,642	3,885,129
				\$1,904,793
MANUFACTURED—Dutiable				
Tires	number	5,034	\$10,247	\$28,751
Other rubber manufactures	.....	75,019	.....	369,286
Totals	.....	\$85,266	.....	\$398,037

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	5,764,547	\$431,511	26,037,858	\$2,221,603
Balata	17,161	6,318	68,741	19,060
Guayule	.....	.....	24,700	3,575
Gutta percha, rubber substitutes, and scrap	392	228	5,275	991
Rubber manufactures	.....	1,158	.....	4,298
Totals	.....	\$439,215	.....	\$2,249,527

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,789,503	\$80,443	7,623,428	\$371,158
Scrap and old	3,702,707	72,442	20,238,879	509,007
Rubberized automobile cloth	sq. yd. 78,398	38,352	406,080	186,414
Other rubberized piece goods and hospital sheeting	sq. yd. 108,913	47,508	495,118	209,922
Footwear				
Boots	pairs 35,400	88,330	167,031	410,899
Shoes	pairs 48,929	39,884	377,898	256,770
Canvas shoes with rubber soles	pairs 188,543	101,765	889,167	571,003
Soles	doz. pairs 12,120	27,684	33,291	89,052
Heels	doz. pairs 59,342	37,834	350,137	238,051
Water bottles and fountain syringes	number 19,639	10,831	128,560	57,297
Gloves	doz. pairs 9,687	23,614	40,265	104,631
Other druggists' sundries	.....	25,353	.....	139,157
Balloons	gross 57,088	48,566	274,267	245,408
Toys and balls	.....	11,727	.....	51,636
Bathing caps	doz. 8,313	21,112	91,675	176,628
Bands	.....	15,339	223,347	86,788
Erasers	.....	25,200	191,955	114,257
Hard rubber goods	.....	9,731	625,938	68,820
Electrical goods	.....	25,333	.....	110,949
Other goods	.....	.....	.....	.....
Tires				
Truck and bus casings	number 30,428	539,335	187,902	3,915,929
Other automobile casings	number 116,191	864,131	678,943	5,154,134
Tubes, auto	number 83,046	117,886	546,145	765,129
Other casings and tubes	number 12,433	22,538	44,884	89,920
Solid tires for automobiles and motor trucks	number 1,381	42,335	5,452	176,646
Other solid tires	number 44,322	6,488	619,916	92,121
Tire sundries and repair materials	.....	74,007	.....	366,618
Rubber and friction tape	.....	25,033	513,740	146,035
Belting	296,750	130,196	1,416,969	652,928
Hose	445,949	124,001	2,303,976	674,486
Packing	140,757	62,092	616,538	257,856
Thread	139,125	110,295	691,748	629,227
Other rubber manufactures	.....	166,960	.....	779,447
Totals	.....	\$3,027,345	.....	\$17,698,323

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	June, 1931		June, 1930	
	Pounds	Value	Pounds	Value
Maine and New Hampshire	.....	.....	56,000	\$7,964
Massachusetts	6,172,640	\$447,413	3,066,709	412,408
New York	86,818,537	5,824,264	78,431,111	10,743,121
Philadelphia	1,908,967	138,268	33,686	4,267
Maryland	1,710,092	101,298	11,130	1,280
Mobile	.....	.....	111,080	13,316
Georgia	430,167	26,453	676,497	85,295
Los Angeles	8,019,621	504,351	7,107,247	944,734
San Francisco	11,200	1,120	223,445	33,283
Oregon	38,080	2,397	11,212	1,758
Ohio	33,644	2,832	167,322	22,178
Colorado	.....	.....	560,000	75,612
Totals	105,142,948	\$7,048,396	90,455,439	\$12,345,216

United Kingdom Statistics

Imports

	June, 1931		Six Months Ended June, 1931	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber				
From				
Straits Settlements	10,124,900	£135,451	82,492,300	£1,270,385
Federated Malay States	4,803,500	65,748	36,766,100	605,252
British India	1,008,900	13,411	7,046,500	112,793
Ceylon and Dependencies	2,059,700	26,935	14,763,000	237,956
Java and Dutch Borneo	2,511,700	32,864	16,062,000	255,626
Sumatra and other Dutch possessions in Indian Seas	1,057,700	14,537	9,832,200	161,520
Other countries in East Indies and Pacific not elsewhere specified	233,600	3,088	2,172,700	35,929
Brazil	357,100	4,772	2,906,200	59,474
South and Central America (except Brazil)	17,900	248	42,400	595
West Africa				
French West and Equatorial Africa	.....	.....	21,000	382
Gold Coast	28,600	418	175,500	2,666
Other parts of West Africa	219,500	3,388	1,027,200	17,151
East Africa, including Madagascar	800	11	154,700	2,587
Other countries	5,100	79	523,400	10,707
Totals	22,429,000	£300,950	173,985,200	£2,773,023
Gutta percha and balata	160,300	10,802	1,660,700	119,183
Waste and reclaimed rubber	769,800	6,007	4,247,800	39,633
Rubber substitutes, synthetic	1,300	46	7,900	200
Totals	23,360,400	£317,805	179,901,600	£2,932,039

MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£20,907	.....	£103,815
Inner tubes	.....	6,318	.....	31,575
Solid tires	.....	2,808	.....	16,893
Boots and shoes	doz. pairs 94,936	90,343	742,532	770,335
Other rubber manufactures	.....	144,085	.....	894,540
Totals	.....	£264,461	.....	£1,817,158

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	1,080,000	£6,805	7,147,100	£46,264
Rubber substitutes, synthetic	26,400	557	234,000	4,501
Totals	1,106,400	£7,362	7,381,100	£50,765
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£273,247	.....	£1,517,240
Inner tubes	.....	30,763	.....	185,050
Solid tires	.....	3,558	.....	27,798
Boots and shoes	doz. pairs 15,670	18,572	97,440	120,261
Other rubber manufactures	.....	178,016	.....	1,038,245
Totals	.....	£504,156	.....	£2,888,594

Exports—Colonial and Foreign

UNMANUFACTURED				
Crude rubber				
To				
Soviet Union (Russia)	2,945,900	£83,700	13,895,800	£384,482
Sweden, Norway, and Denmark	7,914	1,261,200	24,969	
Germany	1,807,500	27,999	9,433,700	161,724
Belgium	1,058,700	16,827	5,990,400	99,787
France	1,760,900	26,377	9,295,600	176,912
Spain	27,000	628	668,400	17,775
Italy	429,900	5,525	2,434,200	40,313
Other countries in Europe	272,600	5,734	1,858,000	46,025
United States	796,800	18,052	1,632,600	38,948
Other countries	128,400	2,984	777,800	21,231
Totals	9,805,500	£195,740	47,247,700	£1,012,166
Gutta percha and balata	1,000	70	292,300	28,679
Waste and reclaimed rubber	26,000	273	122,100	1,764
Rubber substitutes, synthetic	1,400	18	1,400	18
Totals	9,833,900	£196,101	47,663,500	£1,042,627

MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£2,577	.....	£48,000
Inner tubes	.....	519	.....	2,649
Solid tires	.....	63	.....	215
Boots and shoes	doz. pairs 5,969	5,110	14,695	17,208
Other rubber manufactures	.....	6,226	.....	29,853
Totals	.....	£14,495	.....	£97,925

*Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until Apr. 30, 1926 inclusive, and tires and tubes until Apr. 11, 1927, inclusive.

Latex Shoe Cement

In rubber shoe manufacturing footwear parts are united with a rubber latex cement. The faces are allowed to dry until non-tacky, and they are then pressed together.

United States Crude and Waste Rubber Imports for 1931 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Totals		Balata	Miscellaneous	Waste
								1931	1930			
January	36,525	206	331	36	..	..	..	37,098	47,362	65	960	38
February	35,749	339	516	40	1	..	..	36,645	43,728	1	580	..
March	38,922	352	1,062	2	..	..	..	40,338	45,430	170	800	..
April	46,034	323	291	..	..	..	..	46,648	49,927	196	908	60
May	30,962	248	508	2	..	..	..	31,720	40,745	78	450	2
June	44,495	601	640	40	..	..	..	45,776	42,653	271	892	6
July	40,477	316	211	..	..	..	..	41,004	34,084	131	519	6
Total, seven months, 1931.....	273,164	2,385	3,559	120	1	..	..	279,229	.....	912	5,109	112
Total, seven months, 1930.....	295,739	2,099	4,821	268	180	822	..	.....	303,929	807	4,920	406

Compiled from Rubber Manufacturers Association statistics.

Plantation Rubber Crop Returns by Months

Summary of 615 Producing Companies

	Br. N. Borneo (26 Companies)		Ceylon (102 Companies)		India and Burma (21 Companies)		Malaya (338 Companies)		Netherlands Java (60 Companies)		East Indies Sumatra (60 Companies)		Miscellaneous (8 Companies)		Total (615 Companies)	
	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index
1931																
January	473	96.7	1,776	87.0	397	70.6	13,006	104.6	3,020	115.0	4,324	107.2	225	124.3	23,221	99.8
February	365	74.6	1,138	55.8	160	28.5	11,551	92.9	2,631	100.2	3,721	92.3	130	71.8	19,696	84.7
March	378	77.3	1,065	52.2	510	90.7	11,439	92.0	3,174	120.9	4,173	103.5	182	100.6	20,921	89.9
April	351	71.8	1,699	83.2	672	119.6	10,423	83.8	3,069	116.9	3,726	92.4	208	114.9	20,148	86.6
May	426	87.1	1,365	66.9	655	116.5	11,713	94.2	3,235	123.2	4,075	101.1	214	118.2	21,683	93.2
June	398	81.4	919	45.0	239	42.5	11,769	94.7	3,043	115.9	4,255	105.5	212	117.1	20,835	89.6
July	431	88.1	1,329	65.1	209	37.2	13,210	106.2	3,086	117.5	4,515	112.0	218	120.4	22,998	98.9
Seven months ending July																
1931	2,822	..	9,291	..	2,842	..	83,111	..	21,258	..	28,789	..	1,389	..	149,502	..
1930	2,973	..	11,594	..	3,283	..	77,496	..	18,241	..	25,478	..	1,286	..	140,351	..
1929	3,272	..	12,228	..	3,233	..	82,779	..	18,946	..	26,730	..	1,171	..	148,359	..

NOTE. Index figures throughout are based on the monthly average for 1929 = 100. Issued August 13, 1931, by the Commercial Research Department, The Rubber Growers' Association, Inc., London, England.

Rubber Goods Production Statistics

		1931						1930						
		June	May	Apr.	Mar.	Feb.	Jan.	Dec.	Nov.	Oct.	Sept.	Aug.	July	June
TIRES AND TUBES														
Pneumatic casings														
Production	thousands	4,543	3,955	3,730	3,188	2,940	2,251	2,123	2,866	2,692	3,332	3,193	4,098	
Shipments														
Domestic	thousands	4,197	3,804	3,143	2,580	2,855	2,550	2,119	2,613	3,360	3,976	4,229	4,050	
Exports	thousands	135	142	155	142	140	139	148	186	165	164	129	185	
Stocks, end of month	thousands	8,250	8,025	8,012	7,629	7,166	7,203	7,676	7,842	7,849	8,678	9,449	10,622	
Solid and cushion tires														
Production	thousands	11	12	11	11	13	13	13	18	14	16	13	17	
Shipments														
Domestic	thousands	14	14	15	12	12	12	13	19	22	22	19	18	
Exports	thousands	1	1	1	1	1	1	1	1	1	1	1	2	
Stocks, end of month	thousands	61	64	69	73	75	76	76	78	82	90	101	107	
Inner tubes														
Production	thousands	4,330	3,693	3,560	3,133	2,898	2,448	2,144	3,161	3,053	3,837	3,151	3,960	
Shipments														
Domestic	thousands	4,135	3,610	2,922	2,619	3,147	2,634	2,147	2,659	3,525	4,492	4,594	4,082	
Exports	thousands	89	99	109	101	102	96	84	119	108	118	90	131	
Stocks, end of month	thousands	8,439	8,330	8,380	7,937	7,552	7,999	8,250	8,414	8,052	8,589	9,326	10,889	
Raw material consumed														
Fabrics	thous. of lbs.	18,010	15,244	14,041	12,002	12,738	8,358	8,418	11,780	10,917	13,223	13,399	15,034	
Crude rubber	thous. of lbs.	53,418	45,016	41,851	36,651	36,319	25,537	26,253	36,097	33,382	40,736	39,365	45,706	
MISCELLANEOUS RUBBER PRODUCTS														
Calendered rubber clothing														
Net orders	no. coats and sundries	21,161	19,380	16,846	19,380	16,361	21,884	12,881	15,493	25,002	29,364	26,348	28,767	21,249
Production	no. coats and sundries	15,419	18,094	16,803	19,220	18,276	13,059	20,791	22,623	41,291	37,097	44,952	38,582	55,411
Mechanical rubber goods, shipments														
Belting	thous. of dollars	790	832	889	722	759	675	779	954	1,045	1,248	1,364	1,238	
Hose	thous. of dollars	1,857	2,129	1,892	1,611	1,440	1,337	1,276	1,554	1,473	1,682	1,856	2,199	
All other	thous. of dollars	1,584	1,656	1,631	1,378	1,400	1,326	1,345	1,678	1,565	1,622	1,690	1,881	
Total	thous. of dollars	4,231	4,617	4,412	3,711	3,599	3,338	3,400	4,186	4,083	4,552	4,910	5,318	
Rubber bands, shipments	thous. of lbs.	209	215	259	231	222	211	165	197	172	164	174	177	
Rubber flooring, shipments	thous. of sq. ft.	576	569	569	496	366	365	597	682	529	559	507	634	
Rubber heels														
Production	thous. of pairs	15,474	15,408	14,661	13,156	12,973	13,101	11,083	16,460	14,322	13,735	15,117	15,795	
Shipments														
Exports	thous. of pairs	612	578	577	658	748	838	880	966	1,083	780	938	829	
Repair trade	thous. of pairs	3,975	4,038	4,868	4,854	3,939	3,450	4,473	8,291	6,681	6,622	5,053	5,186	
Shoe manufacturers	thous. of pairs	9,693	10,112	10,991	8,397	8,471	6,618	4,578	9,354	9,244	8,813	11,668	10,287	
Stocks, end of month	thous. of pairs	28,491	27,764	26,708	29,335	30,302	29,741	29,130	29,353	31,601	33,226	36,220	38,852	
Rubber-proofed fabrics, production														
Auto fabrics	thous. of yds.	982	710	738	644	577	476	532	915	733	678	608	851	
Raincoat fabrics	thous. of yds.	1,355	1,066	1,040	863	567	738	697	1,426	3,040	3,249	1,805	1,415	1,486
All other	thous. of yds.	1,156	1,002	1,271	1,168	973	891	736	864	1,254	1,064	975	917	1,042
Total	thous. of yds.	3,050	3,381	2,769	2,184	2,206	1,909	2,822	5,209	5,046	3,458	2,940	3,379	
Rubber soles														
Production	thous. of pairs	2,885	2,692	2,292	2,724	2,481	3,021	1,426	3,056	2,193	1,473	2,663	2,734	
Shipments														
Exports	thous. of pairs	62	69	14	36	11	58	60	82	74	74	34	31	
Repair trade	thous. of pairs	336	255	408	290	287	243	280	492	333	317	364	309	
Shoe manufacturers	thous. of pairs	2,651	2,474	2,145	2,259	2,090	2,305	1,011	2,638	1,691	1,161	2,627	2,549	
Stocks, end of month	thous. of pairs	2,655	2,764	2,876	3,167	3,032	2,917	2,390	2,520	2,729	2,289	2,876	3,307	

Source: Survey of Current Business, Bureau of Foreign and Domestic Commerce, Washington, D. C.

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FOR SALE Vulcanizing Oven 6 by 8 feet; 41-inch mill with
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P. O. BOX 385, PAWTUCKET, R. I.

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Medford, Mass.

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Two Curtis & Marble Heath type 64" brush machines with
calender rolling device and blower
Two Curtis & Marble 88" brush machines
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One 21 can drying machine
One 59" doubling machine
Two cloth wind-ups
One varnish machine
Two three roll embossing calenders 65"
Three Farrel hydraulic belt presses
One Blake hydraulic pump and tank type accumulator
Thirty Farrel and Birmingham hydraulic presses
Twenty mixing mills from 40" to 60"
One No. 3 Banbury mixer
Three Devine No. 30 vacuum shelf driers complete with pumps
and surface condensers
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Two four roll calenders
One 12" x 30" four roll shoe calender
Four 250 Farrel reduction gear drives
Vulcanizers, tubing machines, gravity conveyor, stock trucks
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LAWRENCE N. BARRY, Inc., 41 Locust St., Medford, Mass.

BUYERS' GUIDE

BUFFING MACHINES.

Albert, L., & Son, Trenton, N. J.
Emerson Apparatus Co., Melrose,
Mass.
Utility Manufacturing Co., Cudahy, Wis.

BULBS.

Davol Rubber Co., Providence,
R. I.
Jenkins Bros., New York, N. Y.
Whitall Tatum Co., New York.

CADMIUM YELLOW.

Grasselli Chemical Co., The,
Cleveland, Ohio.
Hammill & Gillespie, Inc., New
York, N. Y.
Wishnick-Tumpeper, Inc., New
York.

CALENDER SCREW-DOWN—Motor Driven.

Farrel-Birmingham Co., Inc., An-
sonia, Conn.

CALENDER SHELLS.

Albert, L., & Son, Trenton, N. J.
Gammett, W. F. Co., The,
Cadia, Ohio.
Lowe, Clyde E., Co., The, Cleve-
land, Ohio.
National Sherardizing & Machine
Co., The, Hartford, Conn.

CALENDERED GOODS.

Archer Rubber Co., Milford,
Mass.
Canfield Rubber Co., Bridgeport,
Conn.
Chicago Rubber Clothing Co.,
Racine, Wis.
Jenkins Bros., New York, N. Y.
Plymouth Rubber Co., Inc., Can-
ton, Mass.
Poccono Rubber Cloth Co., The,
Trenton, N. J.
Rand Rubber Co., Inc., Brooklyn,
N. Y.

CALENDERS.

Adamson Machine Co., The,
Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Bolling, Stewart, & Co., Inc.,
Cleveland, Ohio.
Farrel-Birmingham Co., Inc.,
Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co.,
Trenton, N. J.

CALENDERS—Brake Lining.

Black Rock Mfg. Co., The,
Bridgeport, Conn.

CALENDERS—Embossing.

Albert, L., & Son, Trenton, N. J.
Butterworth, H. W., & Sons Co.,
Philadelphia, Pa.
Farrel-Birmingham Co., Inc., An-
sonia, Conn.
Textile-Finishing Machinery Co.,
Providence, R. I.

CALENDERS—Packing.

Black Rock Mfg. Co., The,
Bridgeport, Conn.

CALIPERS—Roll.

Farrel-Birmingham Co., Inc., An-
sonia, Conn.

CALORIMETERS.

Emerson Apparatus Co., Melrose,
Mass.

CARBON BLACK.

Binney & Smith Co., New York.
Cabot, Godfrey L., Inc., Boston,
Mass.
General Atlas Carbon Co., New
York, N. Y.
Grasselli Chemical Co., The,
Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Huber, J. M., Inc., New York.
Imperial Oil & Gas Products Co.,
Pittsburgh, Pa.
Jacoby, Ernest, Boston, Mass.

CARBON BLACK (Continued)

United Carbon Co., Charleston,
W. Va.
Wishnick-Tumpeper, Inc., New
York.

CARBON TETRACHLORIDE AND BISULPHIDE.

Grasselli Chemical Co., The,
Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Wishnick-Tumpeper, Inc., New
York.

CARD CLOTHING FOUNDATIONS.

Mechanical Fabric Co., Provi-
dence, R. I.

CASTINGS.

Adamson Machine Co., The, Ak-
ron, Ohio.
Farrel-Birmingham Co., Inc.,
Ansonia, Conn.
Nagle Machine Co., Erie, Pa.

CAUSTIC SODA.

Grasselli Chemical Co., The,
Cleveland, Ohio.
Wishnick-Tumpeper, Inc., New
York.

CEMENT CHURNS.

Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co.,
Boston, Mass.

CEMENT—Rubber.

Chicago Rubber Clothing Co.,
Racine, Wis.
Essex Rubber Co., Trenton, N. J.
Gutta Percha & Rubber, Ltd.,
Toronto, Can.
Schrader & Ehlers, New York,
N. Y.
Tyson Bros., Inc., Woodbridge,
N. J.

CEMENTING EQUIPMENT.

United Shoe Machinery Corp.,
Boston, Mass.

CHALK—Precipitated.

Huber, J. M., Inc., New York,
N. Y.
Whittaker Clark & Daniels, Inc.,
New York, N. Y.

CHEMISTS—Consulting Rubber.

Gurman, I. T., Malden, Mass.
Maywald, F. J., Carlsstadt, N. J.
Olin, R. R., Laboratories, Akron,
Ohio.
Zieser, Waldemar, Dr., Munchen,
Germany.

CHICLE—Synthetic.

Sweets Laboratories, Inc., New
York, N. Y.

CHINA CLAY.

Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New
York, N. Y.
Huber, J. M., Inc., New York.
Vanderbilt, R. T., Co., Inc.,
New York.
Whittaker, Clark & Daniels, Inc.,
New York.
Wishnick-Tumpeper, Inc., New
York.

CHROME—Oxide, Green.

Ansbacher-Siegle Corp., New
York, N. Y.
Grasselli Chemical Co., The,
Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New
York, N. Y.
Waldo, E. M. & F., Inc., New
York.
Williams, C. K., & Co., Easton,
Pa.
Wishnick-Tumpeper, Inc., New
York.

CHROMIUM PLATING.

National Sherardizing & Machine
Co., The, Hartford, Conn.

CHUCKS—Automatic Core.

Albert, L., & Son, Trenton, N. J.
Bridgwater Machine Co., The,
Akron, Ohio.
National Rubber Machinery Co.,
Akron, Ohio.

CLICKING MACHINES.

Albert, L., & Son, Trenton, N. J.
United Shoe Machinery Corp.,
Boston, Mass.

CLOTH—Jacket.

Lane, J. H., & Co., New York
and Chicago, Ill.

CLOTHING—Waterproof.

Archer Rubber Co., Milford, Mass.
Badger Raincoat Co., Port Wash-
ington, Wis.
Chicago Rubber Clothing Co.,
Racine, Wis.
Pirelli, Milan, Italy.

CLUTCHES—Friction.

Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co.,
Boston, Mass.
Farrel-Birmingham Co., Inc., An-
sonia, Conn.

CLUTCH BRAKES—Pneumatic.

Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., An-
sonia, Conn.

CLUTCH RINGS AND FACINGS.

Thermold Rubber Co., Trenton,
N. J.

COATING MACHINES.

Albert, L., & Son, Trenton, N. J.
Textile-Finishing Machinery Co.,
Providence, R. I.

COCKS—Lubricated Plug.

Barco Manufacturing Co., Chi-
cago, Ill.

COLORS—Balloon.

Ansbacher-Siegle Corp., New
York, N. Y.
Brooklyn Color Works, Inc.,
Brooklyn, N. Y.
Du Pont, E. I., de Nemours &
Co., Inc., Wilmington, Del.
Grasselli Chemical Co., The,
Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.

COLORS—Inorganic.

Ansbacher-Siegle Corp., New
York, N. Y.
Du Pont, E. I., de Nemours &
Co., Inc., Wilmington, Del.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New
York, N. Y.
Huber, J. M., Inc., New York,
N. Y.
Waldo, E. M. & F., Inc., Muir-
kirk, Md.
Whittaker, Clark & Daniels, Inc.,
New York, N. Y.
Williams, C. K., & Co., Easton,
Pa.
Wishnick-Tumpeper, Inc., New
York, N. Y.

COLORS—Organic.

Ansbacher-Siegle Corp., New
York, N. Y.
Brooklyn Color Works, Inc.,
Brooklyn, N. Y.
Du Pont, E. I., de Nemours &
Co., Inc., Wilmington, Del.
Grasselli Chemical Co., The,
Cleveland, Ohio.
Hammill & Gillespie, Inc., New
York, N. Y.
Huber, J. M., Inc., New York,
N. Y.

COMPRESSORS—Air.

Albert, L., & Son, Trenton, N. J.

CONNECTORS—Air.

Akron Standard Mold Co., Akron,
Ohio.

CONTROLLERS—Temperature.

Albert, L., & Son, Trenton, N. J.
Bristol Co., The, Waterbury,
Conn.
Tagliabue, C. J., Mfg. Co.,
Brooklyn, N. Y.
Taylor Instrument Companies,
Rochester, N. Y.

CORD—Pure Rubber.

Boston Woven Hose & Rubber
Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport,
Conn.
Davol Rubber Co., Providence,
R. I.
Gutta Percha & Rubber, Ltd.,
Toronto, Canada.

COTTON FUTURES—Brokers.

Hentz, H., & Co., New York,
N. Y.

COTTON GOODS.

See Ducks and Drills
Hollands
Osnaburgs
Sheetings
Tire Fabrics

COUPLINGS—Flexible and Rigid.

Farrel-Birmingham Co., Inc., An-
sonia, Conn.
Jenkins Bros., New York, N. Y.

CRACKERS.

Adamson Machine Co., The, Ak-
ron, Ohio.
Albert, L., & Son, Trenton, N. J.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., An-
sonia, Conn.
Nagle Machine Co., Erie, Pa.
Thropp, Wm. R., & Sons Co.,
Trenton, N. J.

CRANES.

Baldwin-Southwark Corporation,
Southwark Fdy. & Machine
Co. Division, Philadelphia, Pa.

CRAYONS.

Binney & Smith Co., New York,
N. Y.

CURTAINS—Shower.

Aidan Rubber Co., Philadelphia,
Pa.
Rand Rubber Co., Inc., Brook-
lyn, N. Y.

CUSHIONS—Billiard.

Stowe & Woodward Co., Newton
Upper Falls, Mass.

CUTTERS—Band.

Adamson Machine Co., The, Ak-
ron, Ohio.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The,
Bridgeport, Conn.
Utility Manufacturing Co., Cuda-
hy, Wis.

CUTTERS—Blas.

Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., An-
sonia, Conn.
National Rubber Machinery Co.,
Akron, Ohio.

CUTTERS—Cement Stock.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The,
Bridgeport, Conn.

CUTTERS—Crude Rubber.

Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation,
Southwark Fdy. & Machine
Co., Division, Philadelphia, Pa.
Black Rock Mfg. Co., The,
Bridgeport, Conn.

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We have specialized for many years in supplying guaranteed re-built machinery and carry in stock a most complete inventory of machines, parts, fittings and instruments.

Whatever your demands may be, we are sure to have the exact machine for your purpose, and can give you prompt delivery.

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TUBING MACHINES	ACCUMULATORS	DINKERS
STRAINERS,	REDUCTION GEAR	HYDRAULIC VUL-
DRIERS	DRIVES	CANIZERS, ETC.
CEMENT CHURNS	REFINERS	

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1—18" and 18" by 48" Mill

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BUYERS' GUIDE

CUTTERS—Crude Rubber (Continued)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Peerless Machine Co., The, Racine, Wis.

CUTTERS—Gaskets, Jar Rings, Washers, Radiator Hose, etc.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

CUTTERS—Scrap Rubber.
Albert, L., & Son, Trenton, N. J.
Taylor, Stiles & Co., Riegelsville, N. J.
Utility Manufacturing Co., Cudahy, Wis.

CUTTERS—Sole.
Albert, L., & Son, Trenton, N. J.
Wellman Co., Medford, Mass.

CUTTERS—Stock, Cured and Uncured.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Housatonic Machine & Tool Co., Bridgeport, Conn.
Utility Manufacturing Co., Cudahy, Wis.

CUTTERS—Strip.
Cameron Machine Co., Brooklyn, N. Y.
New England Butt Co., Providence, R. I.

CUTTERS—Tape.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

CUTTERS—Tire.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Peerless Machine Co., The, Racine, Wis.
Utility Manufacturing Co., Cudahy, Wis.

CUTTERS—Tread.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Utility Manufacturing Co., Cudahy, Wis.

CUTTERS—Tube.
Taylor, Stiles & Co., Riegelsville, N. J.

DEGRAS.
Montgomery, W. L., & Co., Boston, Mass.

DENSIMETERS.
Stowe & Woodward Co., Newton Upper Falls, Mass.

DENTAL GUM.
Davol Rubber Co., Providence, R. I.
Rand Rubber Co., Inc., Brooklyn, N. Y.

DENTAL RUBBER DAM.
Davol Rubber Co., Providence, R. I.
Rand Rubber Co., Inc., Brooklyn, N. Y.

DEODORANT.
Vanderbilt, R. T., Co., Inc., New York, N. Y.

DEVULCANIZERS.
Albert, L., & Son, Trenton, N. J.
Biggs Boiler Works Co., The, Akron, Ohio.

DIE SINKING AND ENGRAVING.
Ferriot Brothers, Inc., Akron, O.
Fort Hill Engraving Co., Boston, Mass.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Mechanical Mold & Machine Co., The, Akron, Ohio.

DIES.
Akron Equipment Co., The, Akron, Ohio.
Columbia Rubber Mold Co., The, Cleveland, O.
Fort Hill Engraving Co., Boston, Mass.
Fremont Tool & Die Co., Fremont, Ohio.

DIES (Continued)

Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Mechanical Mold & Machine Co., The, Akron, Ohio.

DIES—Clicking.
United Shoe Machinery Corp., Boston, Mass.

DIES—Cutting.
Fort Hill Engraving Co., Boston, Mass.
Fremont Tool & Die Co., Fremont, Ohio.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

DIES—Embossing.
Ferriot Bros., Inc., Akron, Ohio.
Fort Hill Engraving Co., Boston, Mass.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

DIES—Marking.
Ferriot Bros., Inc., Akron, Ohio.
Fort Hill Engraving Co., Boston, Mass.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

DIPPED GOODS FORMS.
Colonial Insulator Co., The, Akron, Ohio.
Seville Porcelain Co., Seville, O.

DISCS—Joint.
Thermoid Rubber Co., Trenton, N. J.

DISCS—Valve.
Elkhart Rubber Works, Elkhart, Ind.
Garlock Packing Co., The, Palmyra, N. Y.
Jenkins Bros., New York, N. Y.

DISPERSIONS—Crude or Reclaimed Rubber.
Nauvutuck Chemical Co., New York, N. Y.

DOUBLING MACHINES.
Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co., Boston, Mass.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Textile-Finishing Machinery Co., Providence, R. I.
Utility Manufacturing Co., Cudahy, Wis.

DRESS SHIELD MATERIAL.
Aldan Rubber Co., Philadelphia, Pa.
Archer Rubber Co., Milford, Mass.
Canfield Rubber Co., The, Bridgeport, Conn.
Chicago Rubber Clothing Co., Racine, Wis.
Plymouth Rubber Co., Inc., Canton, Mass.
Rand Rubber Co., Inc., Brooklyn, N. Y.

DRESS SHIELDS.
Canfield Rubber Co., The, Bridgeport, Conn.
Rand Rubber Co., Inc., Brooklyn, N. Y.

DRIERS—Cell.
Albert, L., & Son, Trenton, N. J.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.

DRIERS—Cloth.
Albert, L., & Son, Trenton, N. J.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Textile-Finishing Machinery Co., Providence, R. I.

DRIVES—Gear.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

DRUGGISTS' SUNDRIES.
Acushnet Process Co., New Bedford, Mass.

DRUGGISTS' SUNDRIES (Continued)

Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Rand Rubber Co., Inc., Brooklyn, N. Y.

DRUMS—Cooling.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

DRUMS—Tire Building.
Albert, L., & Son, Trenton, N. J.
Bridgewater Machine Co., The, Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

DRYING MACHINES.
Albert, L., & Son, Trenton, N. J.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Textile-Finishing Machinery Co., Providence, R. I.

DUCKS AND DRILLS.
Callaway Mills, Inc., New York.
Curran & Barry, New York.
Lane, J. H., & Co., New York and Chicago, Ill.

DUROMETERS.
Shore Instrument & Mfg. Co., The, Jamaica, N. Y.

ELASTOMETER.
Shore Instrument & Mfg. Co., The, Jamaica, N. Y.

ENGINEERING DEVICES.
Yarnall-Waring Co., Philadelphia, Pa.

EXPERIMENTAL WORK.
Maywald, F. J., Carlstadt, N. J.

EXTRUDING MACHINES.
Royle, John, & Sons, Paterson, N. J.

EYELETING MACHINES.
Albert, L., & Son, Trenton, N. J.
United Shoe Machinery Corporation, Boston, Mass.

FABRIC COATING MACHINES.
American Tool & Machine Co., Boston, Mass.

FABRICS—Double Texture.
Aldan Rubber Co., Philadelphia, Pa.

FACTICE.
See Rubber Substitutes.

FINGER COTS.
Davol Rubber Co., Providence, R. I.
United States Rubber Co., New York.
Whitall Tatum Co., New York.
Wilson Rubber Co., The, Canton, Ohio.

FITTINGS—High Pressure.
Watson-Stillman Co., The, Roselle, N. J.

FIXTURES—Hot Water Bottle, Combination.
Davidson Rubber Co., Boston, Mass.

FLOCK—Cotton, Wool and Rayon.
Claremont Waste Mfg. Co., Claremont, N. H.

FLOORING.
Plymouth Rubber Co., Inc., Canton, Mass.

FORMALDEHYDE.
Hall, C. P., Co., The, Akron, Ohio.

FOSSIL FLOUR.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York.

GAGES—Dial.

Albert, L., & Son, Trenton, N. J.
Randall, Frank E., Waltham, Mass.

GAGES—Hardness.

Shore Instrument & Mfg. Co., The, Jamaica, N. Y.
Stowe & Woodward Co., Newton Upper Falls, Mass.

GAGES—Magnetic.

Black Rock Mfg. Co., The, Bridgeport, Conn.
Magnetic Gauge Co., The, Akron, Ohio.

GAGES—Pressure.

Albert, L., & Son, Trenton, N. J.
Bristol Co., The, Waterbury, Conn.
Tagliabue, C. J., Mfg. Co., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
Utility Manufacturing Co., Cudahy, Wis.
Yarnall-Waring Co., Philadelphia, Pa.

GAGES—Rubber Roller.

Black Rock Mfg. Co., The, Bridgeport, Conn.

GAGES—Thickness.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Magnetic Gauge Co., The, Akron, Ohio.
Randall, Frank E., Waltham, Mass.

GAGES—Tire Pressure.

Schrader's, A., Son, Inc., Brooklyn, N. Y.

GASKETS.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield, H. O., Co., Bridgeport, Conn.
Elkhart Rubber Works, Elkhart, Ind.
Essex Rubber Co., Trenton, N. J.
Garlock Packing Co., The, Palmyra, N. Y.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Thermoid Rubber Co., Trenton, N. J.
Western Rubber Co., Goshen, Ind.
Yarnall-Waring Co., Philadelphia, Pa.

GASTEX.

General Atlas Carbon Co., New York, N. Y.

GEAR CUTTING.

Adamson Machine Co., The, Akron, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

GEARS.

Adamson Machine Co., The, Akron, O.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

GEARS—Helical.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

GEARS—Herringbone.

Adamson Machine Co., The, Akron, O.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

GEARS—Reduction.

Adamson Machine Co., The, Akron, O.
Albert, L., & Son, Trenton, N. J.
Bolling, Stewart, & Co., Inc., Cleveland, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Utility Manufacturing Co., Cudahy, Wis.

BUYERS' GUIDE

GEARS—Worm.

Utility Manufacturing Co., Cudahy, Wis.

GEM DUCK.

Plymouth Rubber Co., Inc., Canton, Mass.

GLOVES—Electricians', Household, Surgeons' and Industrial.

Davol Rubber Co., Providence, R. I.
Wilson Rubber Co., The, Canton, Ohio.

GLYCERINE—Crude.

Gross, A., & Co., New York, N. Y.

GRAPHITE.

Whittaker, Clark & Daniels, Inc., New York.

GRINDERS—Hard Rubber Dust.

Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

GRINDERS—Rubber Roller.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

GUTTA PERCHA.

Hankin, Geo., & Co., London, England. (John L. Handy, Inc., New York.)
Jacoby, Ernest, Boston, Mass.
Schrader & Ehlers, New York, N. Y.
Weber, Hermann, Hoboken, N. J.

GUTTA PERCHA—Refined.

Huntingdon Manufacturing Co., Meadowbrook, Pa.

HARD RUBBER DUST.

Muehlestein, H., & Co., Inc., New York.
Schulman, A., Inc., Akron, Ohio.
Somerset Rubber Reclaiming Works, New Brunswick, N. J.
Weber, Hermann, Hoboken, N. J.

HARD RUBBER GOODS.

Davol Rubber Co., Providence, R. I.
Jenkins Bros., New York, N. Y.
Schrader & Ehlers, New York, N. Y.
Stokes, Joseph, Rubber Co., Trenton, N. J.
Stokes, Joseph, Rubber Co., Ltd., Welland, Ont., Can.

HARD RUBBER GOODS—Druggists' and Stationers' Sundries.

Davol Rubber Co., Providence, R. I.
Pirelli, Milan, Italy.
Stokes, Joseph, Rubber Co., Trenton, N. J.
Stokes, Joseph, Rubber Co., Ltd., Welland, Ont., Can.
Whitall Tatum Co., New York, N. Y.

HARD RUBBER GOODS—Electrical.

Schrader & Ehlers, New York, N. Y.
Stokes, Joseph, Rubber Co., Trenton, N. J.
Stokes, Joseph, Rubber Co., Ltd., Welland, Ont., Can.

HARD RUBBER SOLID.

Weber, Hermann, Hoboken, N. J.

HEEL NAILS.

United Shoe Machinery Corporation, Boston, Mass.

HEELS.

Essex Rubber Co., Trenton, N. J.
Plymouth Rubber Co., Inc., Canton, Mass.
United Shoe Machinery Corp., Boston, Mass.

HEELS AND SOLES.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.

HEELS AND SOLES (Continued)

Essex Rubber Co., Trenton, N. J.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Plymouth Rubber Co., Inc., Canton, Mass.
Western Rubber Co., Goshen, Ind.

HOISTS.

Albert, L., & Son, Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.

HOISTS—Hydraulic.

Albert, L., & Son, Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

HOSE—Rubber.

Acetylene, Air Brake, Creamery, Dredging Sleeves, Fire, Garden, Oil, Oxygen, Pneumatic, Radiator, Sand Blast, Steam, Suction, Submarine, Vacuum, Water.
Acme Rubber Mfg. Co., Trenton, N. J.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Gutta Percha & Rubber, Limited, Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Thermoid Rubber Co., Trenton, N. J.
Western Rubber Co., Goshen, Ind.

HOSE—Rubber Lined.

Cotton and Linen
Acme Rubber Mfg. Co., Trenton, N. J.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.

HOSE FITTINGS—Brass.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Western Rubber Co., Goshen, Ind.

HOSE LININGS.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

HOSE MACHINES.

Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.
Terkelsen Machine Co., Boston, Mass.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

HOSE MACHINES—Air Brake.

Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

HOSE WIRING MACHINES.

Adamson Machine Co., The, Akron, Ohio.

HOSE WRAPPING MACHINES—Paper.

Albert, L., & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

HOSPITAL SHEETINGS.

Aldan Rubber Co., Philadelphia, Pa.
Archer Rubber Co., Milford, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.

HOSPITAL SHEETINGS

(Continued)
Chicago Rubber Clothing Co., Racine, Wis.
Plymouth Rubber Co., Inc., Canton, Mass.
Rand Rubber Co., Inc., Brooklyn, N. Y.

HYDROCARBONS.

Barber Asphalt Co., Philadelphia, Pa.
Wishnick-Tumpeper, Inc., New York, N. Y.

ICE BAGS.

Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Whitall Tatum Co., New York.

ICE CAPS.

Acushnet Process Co., New Bedford, Mass.
Davol Rubber Co., Providence, R. I.

INDICATORS—Dial.

Randall, Frank E., Waltham, Mass.

INFUSORIAL EARTH—See Fossil Flour.**INNER TUBES.**

Acme Rubber Mfg. Co., Trenton, N. J.
General Tire & Rubber Co., Akron, Ohio.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

INSULATED WIRE AND CABLES.

Kerite Insulated Wire & Cable Co., New York.
Pirelli, Milan, Italy.

INSULATING COMPOUNDS.

Canfield Rubber Co., Bridgeport, Conn.
Corone Wire Insulators, Inc., Putnam, Conn.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

INSULATING MACHINERY.

Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Corone Wire Insulators, Inc., Putnam, Conn.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Housatonic Machine & Tool Co., Bridgeport, Conn.
Nagle Machine Co., Erie, Pa.
New England Butt Co., Providence, R. I.
Royle, John, & Sons, Paterson, N. J.

IRON OXIDE—Red.

Binney & Smith Co., New York, N. Y.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. F. Co., The, Akron, Ohio.
Hamill & Gillespie, Inc., New York, N. Y.
Huber, J. M., Inc., New York, N. Y.
Waldo, E. M. & F., Inc., Muirkirk, Md.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Williams, C. K., & Co., Easton, Pa.
Wishnick-Tumpeper, Inc., New York, N. Y.

JAR RING CUTTING MACHINES.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.

JAR RINGS.

Acme Rubber Mfg. Co., Trenton, N. J.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Jenkins Bros., New York, N. Y.
Western Rubber Co., Goshen, Ind.

JOINTS—Expansion.

Barco Manufacturing Co., Chicago, Ill.
Yarnall-Waring Co., Philadelphia, Pa.

JOINTS—Pipe.

Barco Manufacturing Co., Chicago, Ill.
Flexo Supply Co., St. Louis, Mo.
Utility Manufacturing Co., Cudahy, Wis.

JOINTS—Swing.

Albert, L., & Son, Trenton, N. J.
Barco Manufacturing Co., Chicago, Ill.
Bridgewater Machine Co., The, Akron, Ohio.
Flexo Supply Co., St. Louis, Mo.

KETTLES—Steam Jacketed.

Albert, L., & Son, Trenton, N. J.
Biggs Boiler Works Co., The, Akron, Ohio.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.

KNIT FABRICS.

Lehanon Mill Co., Inc., Pawtucket, R. I.

KNIVES.

Fremont Tool & Die Co., Fremont, Ohio.
Taylor, Stiles & Co., Riegelsville, N. J.

LABORATORY EQUIPMENT.

Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Biggs Boiler Works Co., The, Akron, Ohio.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Bristol Co., The, Waterbury, Conn.
Emerson Apparatus Co., Melrose, Mass.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
Shore Instrument & Mfg. Co., The, Jamaica, N. Y.
Tagliabue, C. J., Mfg. Co., Brooklyn, N. Y.
Terkelsen Machine Co., Boston, Mass.

LACQUERS—Rubber Ball, etc.

Sander, Monroe Corp., The, Long Island City, N. Y.

LAMPBLACK.

Binney & Smith Co., New York.
Wishnick-Tumpeper, Inc., New York.

LATEX—Concentrated.

Revertex Corp. of America, New York, N. Y.

LATEX—Rubber.

Hankin, Geo., & Co., London, England. (John L. Handy, Inc., New York.)
Jacoby, Ernest, Boston, Mass.
Jeavons, Tinto & Co., Ltd., London, E. C. 3, Eng.
Naugetuck Chemical Co., New York, N. Y.
Revertex Corp. of America, New York, N. Y.
Wilson, Charles T., Co., Inc., New York, N. Y.
Wood, Chas. E., Inc., New York, N. Y.

LATHES—Hard Rubber.

Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.

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LATHES—Jar Ring.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Thropp, William R., & Sons Co., Trenton, N. J.

LEAD—Oleate.
Hall, C. P. Co., The, Akron, Ohio.
Stamford Rubber Supply Co., The, Stamford, Conn.
Wishnick-Tumpeper, Inc., New York.

LEAD—Stripping Machines.
Robertson, John, Co., Inc., Brooklyn, N. Y.

LEAD—Sublimed.
Hall, C. P. Co., The, Akron, Ohio.
Wishnick-Tumpeper, Inc., New York.

LETTERED MOLD INSERTS.
Fort Hill Engraving Co., Boston, Mass.

LIME.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P. Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeper, Inc., New York.

LINERETTE—Separating Paper.
Cleveland Liner & Mfg. Co., The, Cleveland, Ohio.

LINERS—Processed.
Cleveland Liner & Mfg. Co., The, Cleveland, Ohio.

LININGS—Transmission.
Thermold Rubber Co., Trenton, N. J.

LITHARGE.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P. Co., The, Akron, Ohio.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeper, Inc., New York.

LITHOPONE.
Grasselli Chemical Co., The, Cleveland, Ohio.
New Jersey Zinc Sales Co., New York.
Waldo, E. M. & F., Inc., Mulrirk, Md.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeper, Inc., New York.

LOOMS—Hose.
Albert, L., & Son, Trenton, N. J.
Koyle, John, & Sons, Paterson, N. J.

MACHINERY—Transmission.
Power.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.

MAGNESIA—Calcined.
Grasselli Chemical Co., The, Cleveland, Ohio.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeper, Inc., New York.

MAGNESIUM CARBONATE AND OXIDE.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P. Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeper, Inc., New York, N. Y.

MANDREL WRAPPING MACHINES—Circular.
Albert, L., & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

MANDRELS—Circular.
Albert, L., & Son, Trenton, N. J.
Lowe, Clyde E., Co., The, Cleveland, Ohio.

MANDRELS—Sherardized.
Albert, L., & Son, Trenton, N. J.
National Sherardizing & Machine Co., The, Hartford, Conn.

MANDRELS—Tube Splicing.
Albert, L., & Son, Trenton, N. J.

MARKING DEVICES.
Fort Hill Engraving Co., Boston, Mass.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

MASTICATORS.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

MATTING—Mats and Stair Treads.
Acme Rubber Mfg. Co., Trenton, N. J.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Essex Rubber Co., Trenton, N. J.
Garlock Packing Co., The, Palmyra, N. Y.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Western Rubber Co., Goshen, Ind.

MEASURING MACHINES.
Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co., Hyde Park, Boston, Mass.
Curtis & Marble Machine Co., Worcester, Mass.
New England Butt Co., Providence, R. I.
Utility Manufacturing Co., Cudahy, Wis.

MICA.
Hall, C. P. Co., The, Akron, Ohio.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeper, Inc., New York.

MILLING.
Tyson Bros., Inc., Woodbridge, N. J.

MILLS.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Biggs Boiler Works Co., The, Akron, Ohio.
Bolling, Stewart, & Co., Inc., Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co., Trenton, N. J.

MINERAL RUBBER.
Barber Asphalt Co., Philadelphia, Pa.
Binney & Smith Co., New York, N. Y.
Hall, C. P. Co., The, Akron, Ohio.
Vanderbilt, R. T., Co., Inc., New York.
Wishnick-Tumpeper, Inc., New York.

MITTENS—Tanners'.
Wilson Rubber Co., The, Canton, Ohio.

MIXERS—Automatic.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

MIXERS—Cement, Plastic.
Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co., Boston, Mass.

MIXERS—Internal.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

MOLDED GOODS.
Acushnet Process Co., New Bedford, Mass.
Barr Rubber Products Co., The, Sandusky, O.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., The, Bridgeport, Conn.
Clapp, E. H., Rubber Co., Boston, Mass.
Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Elkhart Rubber Works, Elkhart, Ind.
Essex Rubber Co., Trenton, N. J.
Garlock Packing Co., The, Palmyra, N. Y.
Jenkins Bros., New York, N. Y.
Thermold Rubber Co., Trenton, N. J.
Whitall Tatum Company, New York, N. Y.

MOLDED PLASTIC PARTS.
Stokes, Jos., Rubber Co., Trenton, N. J.

MOLDS.
Adamson Machine Co., The, Akron, Ohio.
Akron Equipment Co., The, Akron, Ohio.
Akron Standard Mold Co., Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Bridgwater Machine Co., The, Akron, Ohio.
Brooklyn Tool Co., Brooklyn, Mass.
Columbia Rubber Mold Co., The, Cleveland, O.
Ferriot Brothers, Inc., Akron, O.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Malm, Henry, New York, N. Y.
Mechanical Mold & Machine Co., The, Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.
Wade, Levi C., Lynn, Mass.

MOLDS—Bead.
Akron Equipment Co., The, Akron, Ohio.
Akron Standard Mold Co., Akron, Ohio.
Bridgwater Machine Co., The, Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

MOLDS—Druggists' Sundries.
Akron Equipment Co., The, Akron, Ohio.
Ferriot Brothers, Inc., Akron, O.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Malm, Henry, New York, N. Y.
Mechanical Mold & Machine Co., Akron, Ohio.
Wade, Levi C., Lynn, Mass.

MOLDS—Engraving Tire.
Akron Equipment Co., The, Akron, Ohio.
Bridgwater Machine Co., The, Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

MOLDS—Hard Rubber and Battery Jar.
Ferriot Bros., Inc., Akron, Ohio.

MOLDS—Heels and Soles.
Albert, L., & Son, Trenton, N. J.
Brooklyn Tool Co., Brooklyn, Mass.
Columbia Rubber Mold Co., The, Cleveland, O.
Ferriot Brothers, Inc., Akron, O.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Mechanical Mold & Machine Co., Akron, Ohio.
Wade, Levi C., Lynn, Mass.

MOLDS—Inner Tube.
Akron Equipment Co., Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

MOLDS—Mechanical Rubber Goods.
Adamson Machine Co., Akron, Ohio.
Akron Equipment Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Brooklyn Tool Co., Brooklyn, Mass.
Columbia Rubber Mold Co., The, Cleveland, O.
Ferriot Brothers, Inc., Akron, O.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
Lowe, Clyde E., Co., Cleveland, Ohio.
Malm, Henry, New York, N. Y.
Mechanical Mold & Machine Co., Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.
Wade, Levi C., Lynn, Mass.

MOLDS—Miniature Tire.
Ferriot Bros., Inc., Akron, Ohio.
Malm, Henry, New York, N. Y.

MOLDS—Toys, Dolls, and Novelties.
Albert, L., & Son, Trenton, N. J.
Ferriot Bros., Inc., Akron, Ohio.
Malm, Henry, New York, N. Y.

MOLDS AND CORES—Tires.
Adamson Machine Co., The, Akron, Ohio.
Akron Equipment Co., Akron, Ohio.
Akron Standard Mold Co., Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Bridgwater Machine Co., The, Akron, Ohio.
Franz Foundry & Machine Co., Akron, Ohio.
National Rubber Machinery Co., Akron, Ohio.

MOTORS—Electric.
Albert, L., & Son, Trenton, N. J.
Bolling, Stewart, & Co., Inc., Cleveland, Ohio.

NAPHTHAS.
Anderson-Prichard Oil Corporation, Akron, Ohio.
Hall, C. P. Co., The, Akron, Ohio.

NIPPLES—Rubber.
Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Whitall Tatum Co., New York.

OCBRE.
Waldo, E. M. & F., Inc., Mulrirk, Md.
Whittaker, Clark & Daniels, Inc., New York, N. Y.

OILS—Palm, etc.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeper, Inc., New York.

OIL—Red.
Gross, A., & Co., New York, N. Y.

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Wishnick-Tumpeier, Inc., New York.

OIL WELL SUPPLIES.
Jenkins Bros., New York, N. Y.

OSNABURGS.
Callaway Mills, Inc., New York.
Curran & Barry, New York.
Lane, J. H. & Co., New York and Chicago, Ill.

OVENS—Conditioning.
Emerson Apparatus Co., Melrose, Mass.

OXIDE—Maroon.
Ansbacher-Siegle Corp., New York, N. Y.
Hammill & Gillespie, Inc., New York, N. Y.

PACKING—Asbestos.
Garlock Packing Co., The, Palmyra, N. Y.
Jenkins Bros., New York, N. Y.
Thermold Rubber Co., Trenton, N. J.

PACKING—Flax.
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Leather.
Watson-Stillman Co., The, Roselle, N. J.

PACKING—Rubber.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Elkhart Rubber Works, Elkhart, Ind.
Essex Rubber Co., Trenton, N. J.
Garlock Packing Co., The, Palmyra, N. Y.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Schrader & Ehlers, New York, N. Y.
Thermold Rubber Co., Trenton, N. J.
Western Rubber Co., Goshen, Ind.

PAPER—Linerette Separating.
Cleveland Liner & Mfg. Co., The, Cleveland, Ohio.

PARIS WHITE.
Taintor Co., The, Bayonne, N. J.

PATENT ATTORNEY.
Zieser, Waldemar, Dr., Munchen, Germany.

PATTERN MAKERS.
Adamson Machine Co., The, Akron, Ohio.
Bridgwater Machine Co., The, Akron, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.

PINE TAR.
Hall, C. P. Co., The, Akron, Ohio.
Wishnick-Tumpeier, Inc., New York.

PIPE FITTINGS—Hard Rubber.
Stokes, Jos., Rubber Co., Trenton, N. J.

PITCH.
Hall, C. P. Co., The, Akron, Ohio.
Wishnick-Tumpeier, Inc., New York.

PLANTATION MACHINERY.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.

PLASTER OF PARIS.
Hammill & Gillespie, Inc., New York, N. Y.

PLASTICATORS.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

PLASTOMETER.
Black Rock Mfg. Co., The, Bridgeport, Conn.

PLATENS—Steam.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Bolling, Stewart, & Co., Inc., Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
French Oil Mill Machinery Co., Piqua, Ohio.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co., Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

PLATES—Steam.
Albert, L. & Son, Trenton, N. J.
Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.

PLUMBERS' SUPPLIES.
Acme Rubber Mfg. Co., Trenton, N. J.
Canfield Co., H. O., Bridgeport, Conn.
Canfield Rubber Co., Bridgeport, Conn.
Essex Rubber Co., Trenton, N. J.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Jenkins Bros., New York, N. Y.

POLISHERS—Rubber Roller.
Black Rock Mfg. Co., The, Bridgeport, Conn.

PONCHOS.
Archer Rubber Co., Milford, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Chicago Rubber Clothing Co., Racine, Wis.

POWER TRANSMISSION MACHINERY.
Albert, L. & Son, Trenton, N. J.
American Tool & Machine Co., Boston, Mass.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

PRESSES—Bakelite.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Terkelsen Machine Co., Boston, Mass.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Bead.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Belt.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Erie Foundry Co., Erie, Pa.

PRESSES—Belt (Continued).
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Belt Splicing.
Adamson Machine Co., The, Akron, Ohio.

PRESSES—Die Sinking.
Albert, L. & Son, Trenton, N. J.
Robertson, John, Co., Inc., Brooklyn, N. Y.

PRESSES—Hand, Screw, and Power.
Albert, L. & Son, Trenton, N. J.
Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.

PRESSES—Heater.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Franz Foundry & Machine Co., The, Akron, Ohio.
Nagle Machine Co., Erie, Pa.
Watson-Stillman Co., The, Roselle, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Hot Plate.
Albert, L. & Son, Trenton, N. J.
French Oil Mill Machinery Co., The, Piqua, Ohio.

PRESSES—Hydraulic.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Bolling, Stewart, & Co., Cleveland, Ohio.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.
Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
French Oil Mill Machinery Co., The, Piqua, Ohio.
Nagle Machine Co., Erie, Pa.
Robertson, John, Co., Inc., Brooklyn, N. Y.
Terkelsen Machine Co., Boston, Mass.
Thropp, Wm. R., & Sons Co., Trenton, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Kruuckle Joint.
Albert, L. & Son, Trenton, N. J.
Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.

PRESSES—Lead Encasing.
Albert, L. & Son, Trenton, N. J.
Robertson, John, Co., Inc., Brooklyn, N. Y.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Molding.
Albert, L. & Son, Trenton, N. J.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
French Oil Mill Machinery Co., The, Piqua, Ohio.
Nagle Machine Co., Erie, Pa.
Terkelsen Machine Co., Boston, Mass.
Watson-Stillman Co., The, Roselle, N. J.

PRESSES—Mechanical Molding.
Albert, L. & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

PRESSES—Packing.
Albert, L. & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

PRESSES—Plastic Molding.
Albert, L. & Son, Trenton, N. J.
Watson-Stillman Co., The, Roselle, N. J.

PRESSES—Tiling.
Albert, L. & Son, Trenton, N. J.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Utility Manufacturing Co., Cudahy, Wis.

PRESSES—Tire.
Adamson Machine Co., The, Akron, Ohio.
Akron Equipment Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Nagle Machine Co., Erie, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Tire Rimming.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Nagle Machine Co., Erie, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Tire Vulcanizing.
Adamson Machine Co., The, Akron, Ohio.
Akron Equipment Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Nagle Machine Co., Erie, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

PRESSES—Toggle.
Albert, L. & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

PRESSES—Vulcanizing.
Adamson Machine Co., The, Akron, Ohio.
Albert, L. & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Bolling, Stewart, & Co., Cleveland, Ohio.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
French Oil Mill Machinery Co., The, Piqua, Ohio.
Nagle Machine Co., Erie, Pa.
Robertson, John, Co., Inc., Brooklyn, N. Y.
Terkelsen Machine Co., Boston, Mass.
Thropp, William R., & Sons Co., Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

PRINTING MACHINES.
Textile-Finishing Machinery Co., Providence, R. I.

PROCESS RETORTS—Welded.
Biggs Boiler Works Co., The, Akron, Ohio.

PROOFING.
Aldan Rubber Co., Philadelphia, Pa.
Archer Rubber Co., Milford, Mass.
Badger Raincoat Co., Port Washington, Wis.
Chicago Rubber Clothing Co., Racine, Wis.
Plymouth Rubber Co., Inc., Canton, Mass.
Pocong Rubber Cloth Co., The, Trenton, N. J.

PUMICE.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York, N. Y.

PUMP RINGS AND SLEEVES.
Jenkins Bros., New York, N. Y.

PUMPS.
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 Dunning & Boasbert Press Co., Inc., Syracuse, N. Y.
 French Oil Mill Machinery Co., The, Piqua, Ohio.
 Robertson, John, Co., Inc., Brooklyn, N. Y.
 Watson-Stillman Co., The, Roselle, N. J.
 Wood, R. D., & Co., Philadelphia, Pa.

PUMPS—Centrifugal.

Albert, L., & Son, Trenton, N. J.
 Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.

PUNCHES—Cloth and Fabric.

Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

RAINCOATS.

Chicago Rubber Clothing Co., Racine, Wis.

RECLAIMED RUBBER.

Clapp, E. H., Rubber Co., Boston, Mass.
 Jacoby, Ernest, Boston, Mass.
 Neapara Rubber Co., Trenton, N. J.
 Pequannoc Rubber Co., Butler, N. J.
 Philadelphia Rubber Works Co., The, Akron, Ohio.
 Rubber Regenerating Co., Naugatuck, Conn.
 Somerset Rubber Reclaiming Works, New Brunswick, N. J.
 Xylos Rubber Co., Akron, Ohio.

RECLAIMING MACHINERY.

Adamson Machine Co., The, Akron, Ohio.
 Albert, L., & Son, Trenton, N. J.
 Biggs Boiler Works Co., The, Akron, Ohio.
 Erie Foundry Co., Erie, Pa.
 Farrel-Birmingham Co., Inc., Ansonia, Conn.
 Nagle Machine Co., Erie, Pa.

RECORDING INSTRUMENTS—

Pressure, Temperature.
 Albert, L., & Son, Trenton, N. J.
 Bristol Co., The, Waterbury, Conn.
 Tagliabue, C. J., Mfg. Co., Brooklyn, N. Y.
 Taylor Instrument Cos., Rochester, N. Y.

REFINERS.

Adamson Machine Co., The, Akron, Ohio.
 Albert, L., & Son, Trenton, N. J.
 Erie Foundry Co., Erie, Pa.
 Farrel-Birmingham Co., Inc., Ansonia, Conn.
 Nagle Machine Co., Erie, Pa.

REGULATORS—Temperature, Pressure, Time.

Taylor Instrument Cos., Rochester, N. Y.

REPAIR STOCK.

General Tire & Rubber Co., Akron, Ohio.

RESIN.

Wishnick-Tumpeper, Inc., New York.

RETRADING EQUIPMENT—Tire.

Albert, L., & Son, Trenton, N. J.
 Franz Foundry & Machine Co., The, Akron, Ohio.
 National Rubber Machinery Co., Akron, Ohio.

REVERTEX.

Revertex Corporation of America, New York, N. Y.

RINGS—Bead Setting.

Akron Equipment Co., The, Akron, Ohio.
 Akron Standard Mold Co., Akron, Ohio.
 Bridgwater Machine Co., The, Akron, Ohio.

RINGS—Mold Side.

Akron Equipment Co., The, Akron, Ohio.

ROLLERS—Printing.

Stowe & Woodward Co., Newton Upper Falls, Mass.

ROLLERS AND STITCHERS—

Hand.
 Hoggson & Pettis Mfg. Co., The, New Haven, Conn.
 Wellman Co., Medford, Mass.

ROLLING MILLS—Tin.

Farrel-Birmingham Co., Inc., Ansonia, Conn.

ROLLS—Chilled.

Adamson Machine Co., The, Akron, Ohio.
 Albert, L., & Son, Trenton, N. J.
 Curtis & Marble Machine Co., Worcester, Mass.
 Farrel-Birmingham Co., Inc., Ansonia, Conn.
 Nagle Machine Co., Erie, Pa.
 Thropp, Wm. R., & Sons Co., Trenton, N. J.

ROLLS—Engraving.

Ferriot Bros., Inc., Akron, Ohio.
 Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

ROLLS—Rubber Covered.

Acme Rubber Mfg. Co., Trenton, N. J.
 Archer Rubber Co., Milford, Mass.
 Gutta Percha & Rubber, Ltd., Toronto, Canada.
 Jenkins Bros., New York, N. Y.
 Stowe & Woodward Co., Newton Upper Falls, Mass.

ROLLS—Spreader.

Albert, L., & Son, Trenton, N. J.
 Curtis & Marble Machine Co., Worcester, Mass.

ROLLS—Wringer.

Albert, L., & Son, Trenton, N. J.
 Gutta Percha & Rubber, Ltd., Toronto, Canada.
 Western Rubber Co., Goshen, Ind.

ROSIN.

Wishnick-Tumpeper, Inc., New York.

ROTTEN STONE.

Hammill & Gillespie, Inc., New York, N. Y.

RUBBER BATCHED PIGMENTS.

Somerset Rubber Reclaiming Works, New Brunswick, N. J.

RUBBER—Brokers.

Jacoby, Ernest, Boston, Mass.
 Schulman, A., Inc., Akron, Ohio.
 Wood, Chas. E., Inc., New York, N. Y.

RUBBER FUTURES—Brokers.

Hentz, H., & Co., New York, N. Y.

RUBBER—Importers and Exporters.

Continental Rubber Co., New York.
 Hankin, Geo., & Co., London, England. (John L. Handy, Inc., New York.)
 Jacoby, Ernest, Boston, Mass.
 Jeavons, Tinto & Co., Ltd., London, Eng.
 Muehlstein, H., & Co., Inc., New York.
 Weber, Hermann, Hoboken, N. J.
 Wilson, Charles T., Co., Inc., New York.
 Wood, Chas. E., Inc., New York, N. Y.

RUBBER—Washed and Dried.

Acushnet Process Co., New Bedford, Mass.
 Wood, Chas. E., Inc., New York, N. Y.

RUBBER BANDS.

Davol Rubber Co., Providence, R. I.
 Easthampton Rubber Thread Co., Easthampton, Mass.
 Plymouth Rubber Co., Inc., Canton, Mass.

RUBBER COATED CLOTHS.

Aldan Rubber Co., Philadelphia, Pa.
 Archer Rubber Co., Milford, Mass.
 Boston Woven Hose & Rubber Co., Cambridge, Mass.
 Canfield Rubber Co., The, Bridgeport, Conn.
 Chicago Rubber Clothing Co., Racine, Wis.
 Mechanical Fabric Co., Providence, R. I.
 Pirelli, Milan, Italy.
 Plymouth Rubber Co., Inc., Canton, Mass.
 Pocono Rubber Cloth Co., The, Trenton, N. J.
 Rand Rubber Co., Inc., Brooklyn, N. Y.

RUBBER COVERING MACHINES.

Albert, L., & Son, Trenton, N. J.
 New England Butt Co., Providence, R. I.

RUBBER EXCHANGE—Members.

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 Muehlstein, H., & Co., Inc., New York.
 Wilson, Charles T., Co., Inc., New York.
 Wood, Chas. E., Inc., New York, N. Y.

RUBBER SUBSTITUTES.

Ashley, T. C., & Co., Boston, Mass.
 Carter Bell Mfg. Co., The, New York.
 Hall, C. P., Co., The, Akron, Ohio.
 Jacoby, Ernest, Boston, Mass.
 Stamford Rubber Supply Co., The, Stamford, Conn.
 Tyson Bros., Inc., Woodbridge, N. J.
 Whittaker, Clark & Daniels, Inc., New York, N. Y.

SANITARY GOODS.

Aldan Rubber Co., Philadelphia, Pa.
 Archer Rubber Co., Milford, Mass.
 Canfield Rubber Co., The, Bridgeport, Conn.
 Plymouth Rubber Co., Inc., Canton, Mass.
 Rand Rubber Co., Inc., Brooklyn, N. Y.

SCLEROSCOPES.

Shore Instrument & Mfg. Co., The, Jamaica, N. Y.

SCRAP RUBBER.

Chafin Rubber Trading Co., Inc., New York.
 Cummings, Wm. H., & Sons, New York.
 Muehlstein, H., & Co., Inc., New York.
 Norton, M., & Co., Medford, Mass.
 Schulman, A., Inc., Akron, Ohio.
 Weber, Hermann, Hoboken, N. J.

SECOND-HAND MACHINERY.

Albert, L., & Son, Trenton, N. J.
 Barry, Lawrence N., Inc., Boston, Mass.
 Bolling, Stewart, & Co., Inc., Cleveland, Ohio.
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 Sherman, Geo. W., Akron, Ohio.
 United Rubber Machinery Exchange, Newark, N. J.

SECONDS AND REMNANTS.

Barry, Lawrence N., Inc., Boston, Mass.

SEWING MACHINES.

Albert, L., & Son, Trenton, N. J.
 Butterworth, H. W., & Sons Co., Philadelphia, Pa.
 Curtis & Marble Machine Co., Worcester, Mass.

SHEET PACKING.

Jenkins Bros., New York, N. Y.
 Schrader & Ehlers, New York, N. Y.

SHEETINGS.

Callaway Mills, Inc., New York.
 Curran & Barry, New York, N. Y.
 Lane, J. H., & Co., New York and Chicago, Ill.

SHERARDIZING.

National Sherardizing & Machine Co., The, Hartford, Conn.

SHOES—Canvas.

Gutta Percha & Rubber, Ltd., Toronto, Canada.

SILICA.

Hall, C. P., Co., The, Akron, Ohio.
 Hammill & Gillespie, Inc., New York, N. Y.
 Whittaker, Clark & Daniels, Inc., New York.
 Wishnick-Tumpeper, Inc., New York.

SINGING MACHINES.

Butterworth, H. W., & Sons Co., Philadelphia, Pa.

SKIVING MACHINES.

Albert, L., & Son, Trenton, N. J.
 Nagle Machine Co., Erie, Pa.
 United Shoe Machinery Corporation, Boston, Mass.

SLITTERS—Belting Duck.

Albert, L., & Son, Trenton, N. J.
 Cameron Machine Co., Brooklyn, N. Y.

SLITTING AND REWINDING MACHINES.

Albert, L., & Son, Trenton, N. J.
 Cameron Machine Co., Brooklyn, N. Y.

SOAP BARK.

Wishnick-Tumpeper, Inc., New York.

SOAPSTONE.

Hammill & Gillespie, Inc., New York.
 Union Talc Co., New York, N. Y.
 Waldo, E. M. & F., Inc., Mulrirk, Md.
 Whittaker, Clark & Daniels, Inc., New York.
 Wishnick-Tumpeper, Inc., New York.

SOFTENERS.

Binney & Smith Co., New York, N. Y.
 Hall, C. P., Co., The, Akron, Ohio.
 Montgomery, W. L., & Co., Boston, Mass.
 Naugatuck Chemical Co., New York, N. Y.

SOLE CUTTING MACHINES.

Albert, L., & Son, Trenton, N. J.
 United Shoe Machinery Corp., Boston, Mass.
 Wellman Company, The, Medford, Mass.

SOLES AND TAPS.

Plymouth Rubber Co., Inc., Canton, Mass.

SOLING—Crépe.

Gutta Percha & Rubber, Ltd., Toronto, Canada.
 Hankin, Geo., & Co., London, England. (John L. Handy, Inc., New York.)
 Jacoby, Ernest, Boston, Mass.
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Hall, C. P., Co., The, Akron, Ohio.

SPECIAL MACHINES.

Black Rock Mfg. Co., The, Bridgeport, Conn.
Housatonic Machine & Tool Co., Bridgeport, Conn.
National Sherardizing & Machine Co., The, Hartford, Conn.

SPECIALTIES—Rubber.

Acushnet Process Co., New Bedford, Mass.
Canfield, H. O., Co., The, Bridgeport, Conn.
Canfield Rubber Co., The, Bridgeport, Conn.
Chicago Rubber Clothing Co., Racine, Wis.
Essex Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Plymouth Rubber Co., Inc., Canton, Mass.
Rand Rubber Co., Inc., Brooklyn, N. Y.
Whitall Tatum Co., New York, N. Y.

SPICING COMPOUNDS.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.
Plymouth Rubber Co., Inc., Canton, Mass.

SPONGE PASTE.

Hall, C. P., Co., The, Akron, Ohio.

SPONGE RUBBER.

Davidson Rubber Co., Boston, Mass.
Jenkins Bros., New York, N. Y.

SPREADERS.

Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
American Tool & Machine Co., Boston, Mass.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Textile-Finishing Machinery Co., Providence, R. I.
Utility Manufacturing Co., Cudahy, Wis.

STACKS—Steel.

Biggs Boiler Works, Co., The, Akron, Ohio.

STAMP GUM.

Gutta Percha & Rubber Ltd., Toronto, Canada.

BUYERS' GUIDE**STARCH—Corn and Potato.**

Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Whittaker, Clark & Daniels, Inc., New York, N. Y.
Wishnick-Tumpeer, Inc., New York.

STATIONERS' RUBBER GOODS.

Davol Rubber Co., Providence, R. I.

STEARATES (Aluminum, Calcium, Magnesium and Zinc).

Binney & Smith Co., New York, N. Y.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York.
Whittaker, Clark & Daniels, Inc., New York.

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Binney & Smith Co., New York.
Gross, A., & Co., New York, N. Y.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York.

STEEL PLATE CONSTRUCTION.

Biggs Boiler Works Co., The, Akron, O.

STITCHERS.

Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

STOCK BOOKS—Metal.

Gammeter, W. F., Co., The, Cadiz, Ohio.

STOPPERS—Rubber.

Canfield, H. O., Co., The, Bridgeport, Conn.
Canfield Rubber Co., Bridgeport, Conn.
Jenkins Bros., New York, N. Y.

STOPIES—Screw (Water Bottle).

Schrader's, A., Son, Inc., Brooklyn, N. Y.

STRAINING MACHINES.

Adamson Machine Co., The, Akron, Ohio.
Corone Wire Insulators, Inc., Putnam, Conn.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Housatonic Machine & Tool Co., Bridgeport, Conn.
Nagle Machine Co., Erie, Pa.
National Rubber Machinery Co., Akron, Ohio.
Royle, John, & Sons, Paterson, N. J.

STRETCHERS—Belting.

Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Wood, R. D., & Co., Philadelphia, Pa.

STRIPPING MACHINES.

Black Rock Mfg. Co., The, Bridgeport, Conn.

SULPHUR.

Battelle & Renwick, New York.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
St. Louis Sulphur & Chemical Co., St. Louis, Mo.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeer, Inc., New York.

SULPHUR CHLORIDE.

Carter Bell Mfg. Co., The, New York.
Hall, C. P., Co., The, Akron, Ohio.
Tyson Bros., Inc., Woodbridge, N. J.
Wishnick-Tumpeer, Inc., New York.

SURGEONS' RUBBER GOODS.

Davol Rubber Co., Providence, R. I.

SYRINGES—Fountain.

Acushnet Process Co., New Bedford, Mass.
Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.

TABLES—Steam.

Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.

TABLES—Stripping.

Akron Standard Mold Co., Akron, Ohio.

TALC.

Binney & Smith Co., New York.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., New York, N. Y.
Union Talc Co., New York, N. Y.
Vanderbilt, R. T., Co., Inc., New York.
Waldo, E. M. & F., Inc., Muirkirk, Md.

TALC (Continued).

Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeer, Inc., New York.

TANKS—Steel (Pressure and Storage).

Biggs Boiler Works Co., The, Akron, Ohio.

TAPE—Cloth Friction.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.
Home Rubber Co., Trenton, N. J.
Plymouth Rubber Co., Inc., Canton, Mass.

TAPE—Golf Ball.

Mechanical Fabric Co., Providence, R. I.

TAPE—Insulating.

Canfield Rubber Co., Bridgeport, Conn.
Plymouth Rubber Co., Inc., Canton, Mass.

TECHNOLOGISTS—Consulting Rubber.

Maywald, F. J., Carlstadt, N. J.
Olin, R. R., Laboratories, Akron, Ohio.

TENTERING MACHINES.

Butterworth, H. W., & Sons Co., Philadelphia, Pa.
Textile-Finishing Machinery Co., Providence, R. I.

TESTING MACHINES.

Akron Equipment Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Scott, Henry L., Co., Providence, R. I.
Shore Instrument & Mfg. Co., The, Jamaica, N. Y.
Stowe & Woodward Co., Newton Upper Falls, Mass.

TESTING MACHINES—Abrasion.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Scott, Henry L., Co., Providence, R. I.

TESTING MACHINES—Flexing.

Scott, Henry L., Co., Providence, R. I.

TESTING MACHINES—Plasticity.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.

TESTING MACHINES—Tensile.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.
Scott, Henry L., Co., Providence, R. I.

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RUB-ER-RED

Copyright 1930 by C. K. Williams & Co.

A new and superior coloring agent for rubber compounding.

Ferric Oxide 99% Specific Gravity 5.15

We are glad to send samples and complete analysis.

C. K. WILLIAMS & COMPANY
Easton, Pa.

GEORGE S. MEPHAM & CO.
East St. Louis, Ill.

RUB-ER-RED sets a new high standard of tinting strength; contains no soluble salts; its acid, copper and manganese content are below the allowable limits of any known rubber specifications; is free of alkali; free of grit; shows a retention of less than 1% on 325 mesh screen; is soft in texture; stable and inert; disperses readily in rubber compounds; produces a clear bright-colored stock, and is always uniform in all characteristics.

THERMATOMIC CARBON.
Vanderbilt, R. T., Co., Inc., N. Y.

THERMOMETERS.

Albert, L., & Son, Trenton, N. J.
Bristol Co., The, Waterbury, Conn.
Tagliabue, C. J., Mfg. Co., Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.

THREAD—Rubber.

Easthampton Rubber Thread Co., Easthampton, Mass.
Mechanical Fabric Co., Providence, R. I.

TILING.

Gutta Percha & Rubber, Ltd., Toronto, Canada.
Plymouth Rubber Co., Inc., Canton, Mass.
Puritan Rubber Mfg. Co., Trenton, N. J.
Western Rubber Co., Goshen, Ind.

TIRE ACCESSORIES.

General Tire & Rubber Co., Akron, O.

TIRE BAND BUILDING MACHINES.

Albert, L., & Son, Trenton, N. J.
National Rubber Machinery Co., Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

TIRE BUILDING MACHINES.

Albert, L., & Son, Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.

TIRE CHOPPERS.

Taylor, Stiles & Co., Riegelsville, N. J.

TIRE CORD AND CORD FABRIC.

Callaway Mills, Inc., New York.
Curran & Barry, New York.
Lane, J. H., & Co., New York and Chicago, Ill.

TIRE MACHINE DRUMS.

Albert, L., & Son, Trenton, N. J.
National Rubber Machinery Co., Akron, Ohio.

TIRE PRESSES.

Adamson Machine Co., The, Akron, Ohio.
Akron Equipment Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Nagle Machine Co., Erie, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

TIRE REBUILDING AND REPAIR EQUIPMENT.

Akron Equipment Co., Akron, Ohio.

BUYERS' GUIDE

TIRE REBUILDING AND REPAIR EQUIPMENT (Continued).

Albert, L., & Son, Trenton, N. J.
Biggs Boiler Works Co., The, Akron, Ohio.
Franz Foundry & Machine Co., Akron, Ohio.

TIRE WRAPPING MACHINES—Bundling.

Albert, L., & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

TIRE WRAPPING MACHINES—Paper.

Terkelsen Machine Co., Boston, Mass.

TIRES—Airplane.

General Tire & Rubber Co., Akron, Ohio.

TIRES—Auto.

General Tire & Rubber Co., Akron, Ohio.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Pirelli, Milan, Italy.

TIRES—Baby Carriage.

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

TIRES—(Solid) Truck.

General Tire & Rubber Co., Akron, Ohio.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Schulman, A., Inc., Akron, Ohio.

TITANIUM OXIDE.

Titanium Pigment Co., Inc., New York, N. Y.

TITANIUM PIGMENTS—Composite.

Titanium Pigment Co., Inc., New York, N. Y.

TOOLS.

Columbia Rubber Mold Co., The, Cleveland, O.
Hoggson & Pettis Mfg. Co., The, New Haven, Conn.

TOYS.

Rand Rubber Co., Inc., Brooklyn, N. Y.

TREAD-MAKING MACHINES.

Adamson Machine Co., The, Akron, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

TREATED LINERS.

Cleveland Liner & Mfg. Co., The, Cleveland, Ohio.

TRIMMERS—Belt.

Bridgewater Machine Co., The, Akron, Ohio.
Morris, T. W., Chicago, Ill.

TRIMMERS—Sole and Heel.

Morris, T. W., Chicago, Ill.
United Shoe Machinery Corp., Boston, Mass.
Utility Manufacturing Co., Cudahy, Wis.

TRIMMERS—Tire Bead.

Bridgewater Machine Co., The, Akron, Ohio.
Morris, T. W., Chicago, Ill.

TRIMMERS—Tire Flap.

Bridgewater Machine Co., The, Akron, Ohio.
Morris, T. W., Chicago, Ill.

TUBE TRIMMING MACHINES.

Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.

TUBE WRAPPING MACHINES.

Akron Standard Mold Co., Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Black Rock Mfg. Co., The, Bridgeport, Conn.

TUBING.

Acme Rubber Mfg. Co., Trenton, N. J.
Archer Rubber Co., Milford, Mass.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Canfield Rubber Co., Bridgeport, Conn.
Davidson Rubber Co., Boston, Mass.
Davol Rubber Co., Providence, R. I.
Essex Rubber Co., Trenton, N. J.
Garlock Packing Co., The, Palmyra, N. Y.
Gutta Percha & Rubber, Ltd., Toronto, Canada.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Thermold Rubber Co., Trenton, N. J.
Western Rubber Co., Goshen, Ind.
Whitall Tatum Co., New York.

TUBING MACHINE PRODUCTS.

Clapp, E. H., Rubber Co., Boston, Mass.

TUBING MACHINES.

Adamson Machine Co., Akron, O.
Albert, L., & Son, Trenton, N. J.
Corone Wire Insulators, Inc., Putnam, Conn.

TUBING MACHINES (Continued).

Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Housatonic Machine & Tool Co., Bridgeport, Conn.
Nagle Machine Co., Erie, Pa.
Royle, John, & Sons, Paterson, N. J.

VALVE BALLS.

Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Stowe & Woodward Co., Newton Upper Falls, Mass.
Western Rubber Co., Goshen, Ind.

VALVES.

Barco Manufacturing Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Watson-Stillman Co., The, Roselle, N. J.
Wood, R. D., & Co., Philadelphia, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES—Air Bag.

Schrader's, A., Son, Inc., Brooklyn, N. Y.

VALVES—Hydraulic.

Dunning & Boschert Press Co., Inc., The, Syracuse, N. Y.
French Oil Mill Machinery Co., The, Piqua, Ohio.
Wood, R. D., & Co., Philadelphia, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES, PUMP—Rubber.

Elkhart Rubber Works, Elkhart, Ind.
Garlock Packing Co., The, Palmyra, N. Y.
Home Rubber Co., Trenton, N. J.
Jenkins Bros., New York, N. Y.
Western Rubber Co., Goshen, Ind.

VALVES—Regulating.

Bristol Co., The, Waterbury, Conn.

VALVES—Rubber.

Canfield, H. O., Co., The, Bridgeport, Conn.
Canfield Rubber Co., The, Bridgeport, Conn.
Garlock Packing Co., The, Palmyra, N. Y.
Jenkins Bros., New York, N. Y.

VALVES—Steam and Pump.

Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Jenkins Bros., New York, N. Y.
Utility Manufacturing Co., Cudahy, Wis.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES—Two Pressure.

Wood, R. D., & Co., Philadelphia, Pa.

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“Imitation is the sincerest form of flattery”

OXIMONY

was the first acid, grit and Manganese free Red Oxide supplied to the Rubber Trade. Constant research and refinement have kept it in a class by itself. Many years' use has proved this. A sample, an analysis and a new low price will be sent on request.

Rubber Pigments Made To Specification

TALCS—FILLERS—COLORS

E. M. & F. WALDO, INC. MUIRKIRK, MARYLAND

BUYERS' GUIDE

VALVES—Two Pressure (Continued).
Yarnall-Waring Co., Philadelphia, Pa.

VALVES AND CAPS—Tire.
Schrader's, A., Son, Inc., Brooklyn, N. Y.

VARNISHES—Rubber.
Sander, Monroe, Corp., The, Long Island City, N. Y.

VARNISHING MACHINES.
Farrel-Birmingham Co., Inc., Ansonia, Conn.

VETERINARIANS' RUBBER GOODS.
Davol Rubber Co., Providence, R. I.

VULCANIZERS.
Adamson Machine Co., Akron, O.
Akron Equipment Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Baldwin-Southwark Corporation, Southwark Fdy. & Machine Co. Division, Philadelphia, Pa.
Biggs Boiler Works Co., Akron, Ohio.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co., Trenton, N. J.
Utility Manufacturing Co., Cudahy, Wis.
Wood, R. D., & Co., Philadelphia, Pa.

VULCANIZERS—Individual Tire.
Akron Standard Mold Co., Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
National Rubber Machinery Co., Akron, Ohio.

VULCANIZERS—Individual Tire (Continued).
Utility Manufacturing Co., Cudahy, Wis.

VULCANIZING AGENTS.
Vanderbilt, R. T., Co., Inc., N. Y.

WARMERS.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

WASHER SETTING MACHINE FOR HEEL MOLDS.
Akron Equipment Co., The, Akron, Ohio.
Utility Manufacturing Co., Cudahy, Wis.

WASHERS.
Canfield, H. O., Co., The, Bridgeport, Conn.
Canfield Rubber Co., The, Bridgeport, Conn.
Jenkins Bros., New York, N. Y.

WASHERS—Crude Rubber.
Adamson Machine Co., The, Akron, Ohio.
Albert, L., & Son, Trenton, N. J.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Nagle Machine Co., Erie, Pa.
Thropp, William R., & Sons Co., Trenton, N. J.

WATER BOTTLES.
Acushnet Process Co., New Bedford, Mass.
Davidson Rubber Co., Boston, Mass.

WATER BOTTLES (Continued).
Davol Rubber Co., Providence, R. I.
Whitall Tatum Co., New York.

WAX.
Hall, C. P., Co., The, Akron, Ohio.

WAX—Montan.
Wishnick-Tumpeer, Inc., N. Y.

WHITING.
Hall, C. P., Co., The, Akron, Ohio.
Hammill & Gillespie, Inc., N. Y.
Huber, J. M., Inc., N. Y.
Southwark Manufacturing Co., Camden, N. J.
Taintor Co., The, Bayonne, N. J.
Vanderbilt, R. T., Co., Inc., N. Y.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeer, Inc., N. Y.

WINDERS.
Albert, L., & Son, Trenton, N. J.
Butterworth, H. W., & Sons Co., Philadelphia, Pa.
Curtis & Marble Machine Co., Worcester, Mass.
Thropp, Wm. R., & Sons Co., Trenton, N. J.

WINDING MACHINES—Golf Ball.
Albert, L., & Son, Trenton, N. J.
Huntingdon Manufacturing Co., Meadowbrook, Pa.
Sibley-Pym Corporation, Lynn, Mass.

WIRE BUNDLING MACHINES.
Terkelsen Machine Co., Boston, Mass.

WIRE COVERING MACHINES.
Corone Wire Insulators, Inc., Putnam, Conn.

WIRE WRAPPING MACHINES.
Terkelsen Machine Co., Boston, Mass.

WOOD FLOUR.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., The, Akron, Ohio.
Wishnick-Tumpeer, Inc., N. Y.

WOOL GREASE.
Montgomery, W. L., & Co., Boston, Mass.

WRAPPING MACHINES — Brake Lining.
Albert, L., & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

WRAPPING MACHINES—Cloth.
Albert, L., & Son, Trenton, N. J.
Terkelsen Machine Co., Boston, Mass.

ZINC OXIDE.
Anaconda Zinc Oxide Dept. of I. L. R. Co., East Chicago, Ind.
Grasselli Chemical Co., The, Cleveland, Ohio.
Hall, C. P., Co., of Calif., The, Los Angeles, Calif.
Hammill & Gillespie, Inc., N. Y.
New Jersey Zinc Sales Co., N. Y.
St. Joseph Lead Co., N. Y.
Waldo, E. M. & F., Inc., Mul Kirk, Md.
Whittaker, Clark & Daniels, Inc., New York.
Wishnick-Tumpeer, Inc., N. Y.

ZINC SULPHIDE.
New Jersey Zinc Sales Co., The, New York, N. Y.

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ERNEST JACOBY

Crude Rubber
Liquid Latex
Carbon Black

BOSTON MASS.

Cable Address: Jacobite Boston

RECLAIMED RUBBER

THAT HAS STOOD
THE TEST FOR YEARS

Special GRADES for the following TRADES

INSULATED WIRE
BOOT AND SHOE
MECHANICAL—AUTO TIRE
PROOFING
HARD RUBBER

We will cheerfully furnish samples upon request

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Factory—East Millstone, N. J., Somerset County

